Modelling and Categorisation of Portuguese GPs' Prescribing Behaviour: The Case of Patients with Hypertension

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Abstract

Building on Reynolds' and Gutman's (1988) assumption that is possible to categorise consumers with respect to their ***values orientation***, we argued that it is possible ***to categorise Portuguese GPs*** according to their ***clinical values***. The **exploratory phase** of this research was therefore developed in accordance with Means-End Chain Theory (Gutman, 1982) and the related Laddering technique (Reynolds and Gutman, 1988). These tools were useful in assessing Portuguese GPs' therapeutic cognitive structures. Resulting hierarchical maps (which summarise the most frequently evoked therapeutic means-end paths) were obtained with newly available software (LadderMap) (Gengler and Reynolds, 1995). The results suggested that ***Portuguese GPs' prescribing behaviour*** was based on different ***patient typologies***. These cognitive schemas were used to develop ***the patient typology model*** (**PTM**). Subsequently, a self-administered questionnaire was sent to 1,500 Portuguese GPs. Factor analysis and multiple logistic regression were the statistical techniques chosen for the analysis of the 309 responses. This **empirical phase** of the research confirmed that the **PTM** is a useful theoretical framework ***to categorise Portuguese GPs*** according to the **stepped-care** approach and the **liberal** approach. The former uses ***diuretics*** and ***β-blockers***, while the latter prefers angiotensin-converting-enzyme (*ACE*) ***inhibitors*** for the management of ***hypertension***.

Declaration

I declare that no portion of the work referred to in this thesis has been submitted in support of an application for another degree or qualification of this or any other university or institution of learning.

Reinaldo A. G. Proença

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An important issue for both industry and academic consumer researchers is the development of an understanding of how consumers derive personally relevant meaning about products. This meaning is the basis consumers use to shape their decision criteria among competitive products and services.

Gengler and Reynolds, 1995.

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1 Chapter One Introduction

This Chapter begins with the scope of the thesis. The second part of the chapter presents an overview of the thesis and the rationale for the two-stage research approach undertaken. The Chapter concludes by summarising the thesis structure.

1.1 Scope of the Thesis

Prescribing is one of the central medical functions of general practitioners (Gilleghan, 1991) and it seems to have begun in 1542: "*Prescribing has been at the very core of general practice since an Act of 1542, the so-called "Quack's Charter", permitted our forebears the apothecaries to supply simple herbal medicines to patients legally*" (Richards, 1996: Foreword). However, research into the prescribing behaviour of general practitioners (GPs) dates from 1949 (Bradley, 1991). In ***Portugal*** there is no academic research on GPs' prescribing behaviour.

The leading drugs prescribed by ***Portuguese GPs*** in early 1990's show how trends and habits change because of the introduction of new effective drugs. For example, the introduction of effective preparations for cardiac disorders, particularly hypertension, caused "heart preparations" to go to the lead (Infarmed[1], 1996).

[1] In Portugal, the National Institute of Pharmacy and Medicines (INFARMED) is the Ministry of Health's central structure that evaluates the entrance of medicinal and health products in the reimbursement system. INFARMED follows up the evolution in the consumption patterns, spreading information and promoting a rational use of medicinal products, aiming at a more rigorous expenditure of the State's financial resources.

Nowadays, primary care doctors in Portugal behave much like GPs in Britain: they serve as doctors of first resort for nearly all medical problems and act as gatekeepers for patients' access to pharmaceutical products (Green, 1997; Agrawal and Calantone, 1995). Two thirds of consultations with GPs end with the issuing of a prescription: "*at least one prescription is given by a GP in two out of three consultations and numerous repeat prescriptions are given to unseen patients*" (Fry, 1993: 59), and "*each general practitioner prescribes, on average, about 18000 items a year*" (Harris, 1996: Introduction).

It has been widely accepted that GPs' prescribing behaviour is not easily altered once established (Denig and Haaijer-Ruskamp, 1995; Taylor and Bond, 1991; Harris et al., 1985; 1984). Nevertheless, Armstrong et al. (1996) studied why doctors changed their prescribing behaviour over six months and found that multiple factors were involved. For example, Chen and Landefeld (1994) found that drug promotion developed by pharmaceutical companies is one of the most important factors that influence GPs' prescribing behaviour.

Devlin and Hemsley (1998) found that typical brand-based drug companies themselves estimate that around the world they spend on average 35% of sales on promotion. Such massive expenditure by the drug companies is not only attached to research and development costs involved in launching a new pharmaceutical brand but also to market conditions:

"*pharmaceutical companies spend millions of pounds promoting their products, particularly new medicines. The reason for this is not hard to understand. For example, it is now estimated that the research and development costs involved in launching a new medicine are in excess of £100 million. With a limited time available under patent protection for exclusive marketing rights, i.e., before generic alternatives erode profits, there is enormous pressure to exploit the potential market for new drugs fully. As a result the companies need to win prescribers over to their new treatments, which in some instances offer only minor advantages over established drugs, or have not been adequately defined in terms of their appropriate place in therapy*" (Hough, 1996: 164).

During the 1980's, the positive impact that pharmaceutical manufacturers' promotion activities can have on influencing GPs' prescribing behaviour was questioned by a British researcher: "*The drug industry spent £169m promoting its products to doctors in 1983, and the estimated expenditure was almost £200m for 1985. That works out at £2500 for each doctor, but almost 80% of the expenditure (£160m) is on general practitioners – over £5000 is thus spent for each general practitioner. In contrast, the NHS spends about £2m refunding expenses incurred by general practitioners attending postgraduate education – less than £70 for each doctor*" (Smith, 1986: 905). Against this pharmaceutical manufacturers' commercial pressure, research was developed by health authorities to describe the types of drugs prescribed by GPs, the additions and deletions made to doctors' repertory and the factors influencing these changes (Gilleghan, 1991;Taylor and Bond, 1991).

In most countries, the ongoing increase in prescribing costs is caused by prescribing new and more expensive products (Denig and Haaijer-Ruskamp, 1995). Some researchers reported that doctors continue to prescribe trade-name drugs when less expensive generics substitutes are available (Avery et al., 2000; Hellerstein, 1994). As new therapeutic categories become available and older drugs are outmoded, the GP will change his/her personal list. The reasons for making such changes are not clear. However, it is possible to argue that GPs have a personal list of therapeutic categories which they prescribe. Furthermore,

"*consumers are said to be insufficiently well informed to decide on the merits of products (quite apart from the cost). Consequently, GPs decide on the efficacy and safety of medicines and, to that extent, are the 'real' consumers. To make matters worse, doctors do not make a price-conscious choice because payment is made by a third party (an insurer or the government). Thus, the relationship between the consumer and producer is very different from that in a typical market. The doctor typically decides whether a product is worth prescribing, the patient takes it, and a third party pays. Normal market disciplines do not operate*" (Green, 1997: 1). As a result, spending on drug costs has tended to rise:

"*expenditure in Denmark, the Netherlands, Sweden and the UK is markedly below that which might be expected but that in France, Greece and* ***Portugal*** *is markedly above*" (Burstall, 1997: 80).

During the 1990's, Portuguese health authorities, following British example, identified ***prescribing in general practice*** as a particular area needing attention (Infarmed, 1996). Portuguese National Health Service (NHS) "revolution", particularly the adoption of international medical guidelines for therapeutic decision-making imposes dramatic changes on prescribing. The purpose of these guidelines is "*to assist practitioners in clinical decision-making, to standardize and improve the quality of patient care, and to promote cost-effective drug prescribing*" (Veterans Health Administration, 1996: 5). Guidelines for the management of hypertension suggested that "*the physician should tailor the choice of drug to the individual patient*" (World Health Organization (WHO) – International Society of Hypertension (ISH), 1999: 168). In line with this reasoning, Monane et al. (1995) suggested that ***patient characteristics*** such as ***age, gender*** and ***race*** were important determinants of drug choice. Therefore, considerable effort was devoted in the present research to the construction of different ***patient typologies***. The conviction that different ***patient typologies*** require alternative therapeutic approaches was reinforced recently by researchers who analysed the factors associated with antibiotic prescribing: "*Prescribing behaviour may have been a function of patient-specific rather than general beliefs about antibiotics*" (Lambert et al., 1997: 1767). Because of the scarcity of the research on this topic, the Means-End Chain theoretical framework (Gutman, 1982) and its laddering procedure (Gengler and Reynolds, 1995; Reynolds and Gutman, 1988) was initially used.

Therefore, ***one of the novel features of the present research*** lies in the use of a ***different approach*** to that employed previously. That is, the approach to research differs from those who believe that the Expectancy-Value Theory (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975) can explain GPs' prescribing behaviour. Consequently, the direction of this research – in both **theory** and **empirical work** – was towards developing an understanding of the ***GPs' clinical values*** that guide drug choice in ***Portugal.*** The emphasis on the relationship between ***therapeutic categories*** and ***patient typologies*** reinforces the importance of ***terminal values***[2] rather than ***instrumental values***: "*terminal values determine choice at the product class level but instrumental values at the brand choice level*" (Howard, 1989: 58). Previous ***pharmaceutical marketing research*** focused on instrumental values at the brand choice level. To our best knowledge, no research has previously defined GPs' clinical ***terminal values*** towards first-line drug therapy. This is the ***second major difference*** from previous research on GPs' drug choice, which is particularly important when categorising GPs according to their first-line drug therapy. Therefore, ***the aim*** of the present research is:

- to conceptualise a new theoretical framework, ***The Patient Typology Model*** (PTM), in order to ***categorise Portuguese GPs*** in accordance with their ***first-line drug therapy to hypertensive patients.***

[2]Howard (1989) defined two-level choice structure in which terminal values operate at the higher level (i.e., product class) and instrumental at the lower level (i.e., brand).

A number of objectives were defined to achieve the aim described earlier:

- to establish which sources of drug information are used by Portuguese GPs to organise their first-line antihypertensive drug therapy;
- to identify demographic and clinical characteristics of hypertensive patients that influence Portuguese GPs' first-line antihypertensive drug therapy; and
- to analyse whether Portuguese GPs' practice and personal factors influence first-line anti-hypertensive drug therapy.

1.2 Overview of the Thesis

It has been suggested that the doctor's prescribing behaviour may vary from country to country and thus national studies are very important (Haaijer-Ruskamp and Hemminky, 1993). Marked differences were found among the major European countries in terms of patterns of prescribing (Stern, 1997; Smith, 1991b; O'Brien, 1984). To date, *no empirical work has been presented to the academic community about patterns of prescribing of Portuguese GPs*. Therefore, the research in this thesis is mainly concerned with *the categorisation of Portuguese GPs in accordance with their first-line antihypertensive drug therapy*. In undertaking this research, it is hoped to contribute to ***a better understanding of GPs' prescribing decisions for patients with hypertension***.

To obtain the desired objective, ***research design*** and ***methodology*** were developed in two different stages:

Stage I: ***Qualitative Approach*** ***(see Chapters Four and Five)***

Individual interviews and focus group discussions with GPs were carried out in order to improve the researchers' familiarity with the anti-hypertensive therapeutic approach. Then, a national exploratory study was developed using the Means-End Chain theoretical framework (Gutman, 1982).

The Means-End Chain Theory was used to identify the linkages between pharmaceutical product attributes, consequences produced through prescribing, and the clinical, personal values of doctors underlying their decision-making processes. In order to retrieve the attribute-consequence-value chain, a one-to-one in depth interview technique called "Laddering" was used to understand the relevant excerpts of doctors' cognitive structures (Gengler and Reynolds, 1995; Reynolds and Gutman, 1988).

Stage II: ***Quantitative Approach*** ***(see Chapters Six, Seven and Eight)***

Based on the findings from the qualitative exploratory phase, the ***Patient Typology Model*** **(PTM)** was developed and a questionnaire was launched on April 1998. In order to improve the response rate, a reminder and a second wave of questionnaires were sent to those GPs not responding to the first questionnaire.

After a ***factor analysis*** was developed to simplify a complex set of data on doctors' sources of drug information, a ***multivariate logistic regression*** was performed in order ***to categorise the Portuguese GPs according to their first-line drug therapy***.

The **methodology** used in the present study is a *combination of two research methods used together for the first time*. To the best of the author's knowledge, this is the first time that *the Laddering approach* (i.e., a semi-qualitative technique) has been used in conjunction with *Multivariate Logistic Regression* (i.e., a quantitative technique) to develop the categorisation process of Portuguese GPs (see Appendix Four).

1.3 Thesis Structure

The conventional ***thesis structure***, which entails a rigid demarcation between Chapters with theoretical reasoning and empirical data, has been followed. The main body of the thesis is arranged in **two parts**:

- **part one**, Chapters II to V, contains the background to the thesis and for this reason is particularly related with the ***qualitative phase*** of the present research;
- **part two**, Chapters VI to IX, based on the ***quantitative approach***, organise the categorisation process of Portuguese GPs and present the managerial implications arising from this study.

Chapters

- **Chapter One**, the present chapter, illuminates the scope of the thesis. An overview of the thesis is also presented.
- **Chapter Two** discusses the crucial role of innovation and new product development within the pharmaceutical market. The Chapter introduces the reader to the importance of hypertension on doctors' prescribing behaviour. In line with this reasoning, the Chapter presents the two opposing philosophies of prescribing on the treatment of essential hypertension. The Chapter finishes with the presentation of a ***flow chart*** representing the study overview (***Figure 2.2: Study Overview***).
- **Chapter Three** presents a review of previous research on doctors' prescribing behaviour and emphasises the most representative models which provide the researcher with an understanding of the process by which doctors make decisions and the factors that influence them.
- **Chapter Four** looks at the Means-End Chain Theory and Laddering technique as the most appropriate theoretical framework for a study of doctors' prescribing-relevant cognitive structure. The Chapter reinforces that the central tenet of the theory is that product, service or behaviour meaning structures stored in memory consist of a chain of hierarchically-related elements.

- **Chapter Five** encapsulates the results from the Means-End Chain approach and reinforces the contribution of these findings to an understanding of doctors' clinical values.

- **Chapter Six** discusses and develops ***the patient typology model*** **(PTM)** as a useful tool to organise both the questionnaire and the entrance of the explanatory variables into the multiple logistic regression equation.

- **Chapter Seven** is concerned with data collection and the research methodology. The main goal of this Chapter is to explain the reasoning behind the research design and methodology. The aim in this discussion is therefore to justify the research approach and to show how various considerations shaped the research design and methodology adopted in the present study.

- **Chapter Eight** analyses the findings from the ***factor analysis*** and the ***logistic regression analysis*** in terms of the categorisation process of Portuguese GPs. In the first part of the Chapter, the model-building approached is explained and the explanatory variables are presented. The second part of the Chapter interprets the multiple logistic regression model parameters in accordance with a number of different statistics. Based upon this, the final multiple logistic regression model is presented. In the last part of the Chapter, ***the selected 16 explanatory variables are used to classify Portuguese GPs*** into ***stepped-care followers*** or ***liberal followers***.

- **The concluding Chapter** provides an overview of the main findings of the research and their managerial implications for marketing strategists. Specifically, **Chapter Nine** examines the interest of the Portuguese GPs' first-line antihypertensive drug therapy in terms of ***stepped-care*** and ***liberal*** approaches to define marketing strategies. The final part of the Chapter outlines the importance of ***the patient typology model*** **(PTM)** as a useful tool to develop pharmaceutical marketing strategies, as well as addressing the limitations of the study and providing suggestions for further research.

2 Chapter Two: The Pharmaceutical Industry and the Context of Research

2.1 Introduction

The initial part of the chapter distinguishes "*ethical pharmaceuticals*" from "*over-the-counter* (OTC) and *proprietary drugs*". This is followed by an examination of the crucial role of innovation and new product development within the pharmaceutical market, which has four different phases[1]. The chapter then goes on to introduce the ways in which medical guidelines influence drug choice. The purpose of the next part of the chapter is to introduce the reader to the importance of hypertension on GPs' prescribing behaviour and to discuss some of the issues which initially triggered the researcher's interest in the therapeutic classes/categories used to treat hypertensive patients.

In the last part of the chapter, a recently developed approach to market research is advanced as a way of understanding doctors' prescribing behaviour. This new avenue of research that is introduced derives from the medical guidelines that have been advanced by EU Members' health authorities. The Chapter also presents the rationale for studying GPs' prescribing decisions in Portugal. The chapter finishes by introducing the flow chart of the present research.

[1] Phase I trials involve 4-5 new chemical entities and examine pharmacokinetics and the tolerability in healthy volunteers, smallest effective dose, dose/effect relationship, duration of effect, and side-effects. Phase II trials bring the first controlled exposure to patients and studies on bioavailability. Phase III trials develop full-scale evaluation of treatment (substantial number of patients/drug comparison with standard treatment). Phase IV trials include Marketing/Post Marketing Surveillance (Taggart and Blaxter, 1992).

2.2 The Pharmaceutical Industry

Pharmaceuticals[2] produced and distributed commercially are generally classified into one of two broad groups (Buzzell and Quelch, 1988):

- ***Ethical pharmaceuticals***, available only through a doctor's prescription;
- ***Over-the-counter (OTC) and proprietary drugs***, sold without prescription.

However, "*it was difficult to draw an exact boundary between the two categories, because drugs that were sold only on physicians' prescriptions in one country were available as OTC products in other countries. In addition, many products that had formerly been classed as ethical drugs had, over time, evolved into OTC products.*" (Buzzell and Quelch, 1988: 78-79). This exploratory study deals **exclusively** with the ***ethical*** sector of the pharmaceutical industry, but does make some mention of OTC products.

The pharmaceutical industry is one of the largest, powerful, wealthiest and most internationally orientated industry sectors in the developed world (Doyle and Monteiro, 1994; McGahan, 1994; Buzzell and Quelch, 1988). However, the success of pharmaceutical industry is heavily dependent on its ability to innovate (Taggart and Blaxter, 1992). This is not easy because pharmaceutical industry's new product development is subject to extensive governmental regulation in almost every country in the world (Green, 1997).

[2]In its broadest sense, the term "pharmaceuticals" includes all kinds of medicinal substances, even medical herbs used as folk remedies. We will use the term "ethical pharmaceuticals/drugs" to distinguish the products that can only be prescribed by doctors.

2.3 The Pharmaceutical Industry's New R&D Strategies

European Union health authorities have progressively applied more rigorous controls to the introduction of new ethical pharmaceutical brands (Infarmed, 2000a; Schwartz, 1998; Taggart and Blaxter, 1992). Often these controls have been extended through time to cover stringent evaluations of established products. Therefore, the time taken between the development and commercialisation of a major, innovative medicine has lengthened, and a gestation period of 10 up to 12 years is now assumed (Cearnal, 1992). As a result, the R&D costs of developing a major innovative medicine are now in excess of 125 million pounds (Waldholz, 1992). Although somewhat unexpected, some pharmaceutical companies are countering low-cost competition from the generics[3] with new defensive strategies:

"*Because patents on many major drugs are scheduled to expire between 1994 and 2000, leading companies may find integration into generics increasingly important to maintain revenue*" (McGahan, 1994: 117).

As a result, many pharmaceutical brands within mature product lines have to face competition from low price generics, and low-cost competition with established leaders is expected to rise (Hellerstein, 1994). Consequently, competition in the market will increase and it will encourage competitors to re-define their marketing strategies.

[3] In order for a generic drug to be marked, the Food and Drug Administration (FDA) requires that the generic manufacturer prove its drug is virtually identical to its trade-name counterpart (Hellerstein, 1994 I).

2.4 A New Pharmaceutical Market Approach

2.4.1 New Pharmaceutical Marketing Strategies

It is of prime importance for pharmaceutical companies operating within the EU market that they identify and understand how doctors develop their "***internal audit***" and make their ***therapeutic decisions***, and to identify what factors influence prescribing behaviour. Meanwhile, they have powerful and diversified tools to disseminate information and to communicate with the doctors, in order to influence prescribing behaviour (Devlin and Hemsley, 1998; Andaleeb and Tallman, 1996; Vicciardo, 1995).

It has been recognised that the industry has a good understanding of the "nature of business", the importance of continual environmental scanning and the dominance of the customer and his/her needs in any planning process (Cortjens, 1991; Fletcher and Hart, 1990). However, some researchers take the opposite view (Doyle and Monteiro, 1994). For example, some researchers pointed out that to exploit the growth opportunity of ethical products within the European market, pharmaceutical manufacturers need to be far more consumer oriented (Dudley, 1994).

Since the mid 1970's pharmaceutical companies have become aware that information directed towards doctors must be problem oriented, and must carefully combine scientific and commercial aspects in order to influence prescribing behaviour (Dittmer, 1975).

Some pharmaceutical manufacturers have been developing customer databases, ensuring that the sales force knows precisely what to communicate, and developing a more targeted approach to their activities according to those areas which offer the greatest potential for creating new business. This new marketing approach relies on a good quality database of existing customers that is instantly transmitted to the sales representatives through information-based selling (Walsh, 1993). That is, pharmaceutical manufacturers are becoming increasingly aware of how much they have to learn from the behavioural sciences in order to remain competitive in the new international arena (Doyle, 1994).

At the same time, however, the pharmaceutical market has been changing dramatically, particularly during the last 10 years: "*The attractiveness of the industry began to deteriorate in the late 1980s and early 1990s as managed care introduced price competition into some segments of the market*" (McGahan, 1994: 117). Consequently, pharmaceutical manufacturers have once again been "invited" to redesign their marketing strategies according to the changes in the health care environment (Doyle and Monteiro, 1994; Buzzell and Quelch, 1988). That is, the reality of the "health care revolution" during the last decade has produced unalterable events which have been shaping the current and future pharmaceutical marketplace. These driving forces within the health care context have market implications for pharmaceutical manufacturers:

"*Health care reform, increasing competition, and overwhelming desire for higher-quality health care at lower prices are all creating competitive pressures, which are transforming our industry*" (Nichols, 1994b: 106).

Changes in doctors' prescribing behaviour, particularly their approach to cost-effective first-line therapy, represents an important dimension in this new pharmaceutical environment.

Given the new competitive pharmaceutical environment, market research[4] and marketing research are crucial for the success of new drugs. Therefore, a new approach to primary care in terms of pharmaceutical promotion is required (Barton, 1993; Adams, 1992). General practitioners are now subject to rational ***prescribing guidelines*** that impose fewer "degrees of freedom" in terms of drug choice. Recent ***prescribing guidelines*** place more emphasis than earlier reports on absolute risk and benefit and uses risk stratification as part of the treatment strategy (WHO-ISH, 1999). *The development of new ethical products in accordance with these* ***prescribing guidelines*** *is one possible strategic option, which requires accurate research on GPs' prescribing decisions.* In summary, pharmaceutical companies can no longer just react to events around them; they must be proactive and develop innovative marketing strategies.

[4]Although the two terms are often used interchangeably, it is useful to distinguish market research - determination and assessment of the qualitative and quantitative dimensions of the market, from marketing research - analysis of the effects of the various marketing activities of a firm and its competitors.

2.4.2 New Link between Medical Guidelines and Doctors' Clinical Values

The huge amount of investment in new product development reinforces the importance of accurate research on GPs' prescribing decisions. Better information on first-line drug choice may have the capacity to reduce the cost of new drug development because it provides a framework that helps to reduce the probability of unpromising compounds being tested in Phase II and Phase III trials. Changes in the pharmaceutical market environment suggest that a drastic shift in the pattern of analysis of new compounds tested in Phase III is critical to pharmaceutical manufacturers. These new compounds must be developed according to the specific characteristics of patients that have been described within different medical guidelines. For example, in preparing medical guidelines for the management of hypertension, the WHO and the ISH were "*keenly aware that there are marked differences between individual patients with similar levels of hypertension, which have important implications for decisions concerning treatment. hypertensive patients differ with respect to age, blood pressure elevation, organ damage and concomitant risk factors and diseases, and they live in societies in which cardiovascular risk and economic resources also differ widely*" (WHO-ISH, 1993: 905). Thus, new drug development according to the specific characteristics of hypertensive patients means less investment on new compounds in Phase III trials.

Recent medical guidelines suggest that the GP "*should tailor the choice of the drug to the individual patient*" (WHO-ISH, 1999: 168).

With information obtained from medical guidelines, it is possible to improve the efficiency of communication strategies in terms of cost-effectiveness: "*As resources grow scarce and money gets tight, pharmaceutical companies are seeking more cost-effective ways to educate, communicate with, and conduct market research with physicians*" (Vicciardo, 1995: 33). Therefore, it is critical to increase innovative market research to understand not only what is happening in the European health care market, but also why it is happening: "*The value we created is by emphasizing the why of the findings, not just what the findings are. More open-ended questions are being added than in the past, resulting in more combined quantitative and qualitative market research studies*" (Lawson, 1997: 255). It seems certain, however, that both clinical context and values, particularly doctors' clinical values, intervene between content and outcome: "*values (of doctors and of patients) and the context in which consultation takes place affect the needs prioritised and the process of the care which follows*" (Howie, 1998: 1022). That is, the link between medical guidelines and doctors' clinical criteria may be used to explain and/or predict GPs' first-line drug therapy. However, to educate, communicate with, and conduct market research with doctors, it is necessary to identify doctors' compliance with those medical guidelines (Hutchinson, 1998). Having a better understanding of how doctors develop their prescribing behaviour may help to define more appropriate marketing strategies for influencing drug choice according to recent "institutional" medical guidelines.

It is, therefore, not surprising, that *the patient's clinical context* and *doctors' clinical values* in terms of their *first-line drug therapy represent a new avenue of research* concerning *GPs' decision-making processes.*

Interest in this ***disease management*** approach was recently pointed out by pharmaceutical researchers:

"*Disease management was one of the areas we talked about. The top management of our company viewed this as an important strategic marketing initiative* (Lawson, 1997: 257)..."*Disease management becomes the stepping stone to creating of focused health care conglomerates*" (Boscheck, 1996: 640).

However, doctors who are responsible for primary care maintain a strong influence over the whole process of the drug therapeutic approach:

"*physicians still retained essentially complete latitude to prescribe as they wished, but they felt an increasing responsibility to respect the financial burden of their prescribing decisions*" (Kossman, 1994: 70).

Nevertheless, drug manufacturers have realised that all the changes described above represent a historic shift (Schwartz, 1995). The new pharmaceutical market constraints are less a "blip", than a new set of conditions to which they had to adapt, particularly continued cost-cutting, price erosion, and even exclusion from the purchasing lists (Koberstein, 1995).

2.5 The Rationale for Studying GPs' Prescribing Decisions in Portugal

Primary care is diverse in its development, organisation, and funding, such that there is a "*considerable variety in consulting patterns by general practitioners throughout the European Union*" (Evans, 1994: 645). To reduce this variety of therapeutic approaches, a significant investment has been made in primary care medical education, and Portugal is no exception within the EU: "*Growing value is placed on the role of the well educated and trained generalist at the primary level. This is clear from developments in the United Kingdom, Holland, Denmark, Sweden, Finland, Spain, and* ***Portugal***" (Evans, 1994: 645).

Health authorities in Portugal, particularly Infarmed[5], are aware that "*prescribing information should always be developed at the country level, with regard to prevailing disease patterns ant the access of the target population to health services - particularly to essential drugs*" (Couper, 1995: 601). Furthermore, "*the nature of factors may vary from country to country and national studies are therefore needed*" (Hemminki, 1975a: 114), (a point recently reinforced by Haaijer-Ruskamp and Hemminki, 1993). However, at the present time, ***the factors that influence Portuguese GPs' prescribing decisions are unknown***. To date, no published studies in the area of drug prescribing have explicitly examined factors that affect the use of Portuguese GPs' decision-making processes. The present study opens this opportunity.

[5] Infarmed is the National Institute of Pharmacy and Medicines (Instituto Nacional da Farmácia e do Medicamento) is a public institution granted with administrative and financial autonomy, under tutelage of the Minister of Health. Its activity is mainly related to medicines for human and veterinary use, and issues opinions on regulations related to research, production, marketing and use of medicines.

2.6 Why Hypertension?

Doctors' prescribing behaviour has been analysed within different clinical contexts. However, the treatment of *hypertensive patients* has been found particularly relevant to understanding and modelling doctors' therapeutic decisions (Hui and Pasic, 1997; Doyle and Monteiro, 1994; Chinburapa and Larson, 1992; 1988; Segal and Hepler, 1985; Zelnio, 1982). This situation is mirrored in Portugal where antihypertensive therapy is the most important class of drugs prescribed by GPs (Infarmed, 1996; 1995). Furthermore, hypertension represents the medical problem most frequently seen by GPs in Portugal, and it accounts for more practice visits and prescriptions than any other disease (Jordão, 1995; Carrageta 1985). In Portugal, *more than 100 brand-name drugs are available to treat hypertensive patients* (Crisógono, 1997). Two main reasons have been advanced to explain the wide range of prescribed antihypertensive drugs:

1. Hypertension is the most common and dangerous cardiovascular disorder, and affects around 20% of the adult population in many countries. Furthermore, "*More than half of the population older than 65 years of age has hypertension, the most important reversible risk factor for cardiovascular complications such as myocardial infarction and stroke*" (Monane et al., 1995). As a result, "*High blood pressure of moderate or severe degree, even if symptomless, carries a large risk of complications, particularly of stroke*" (Evans and Rose, 1971: 37).

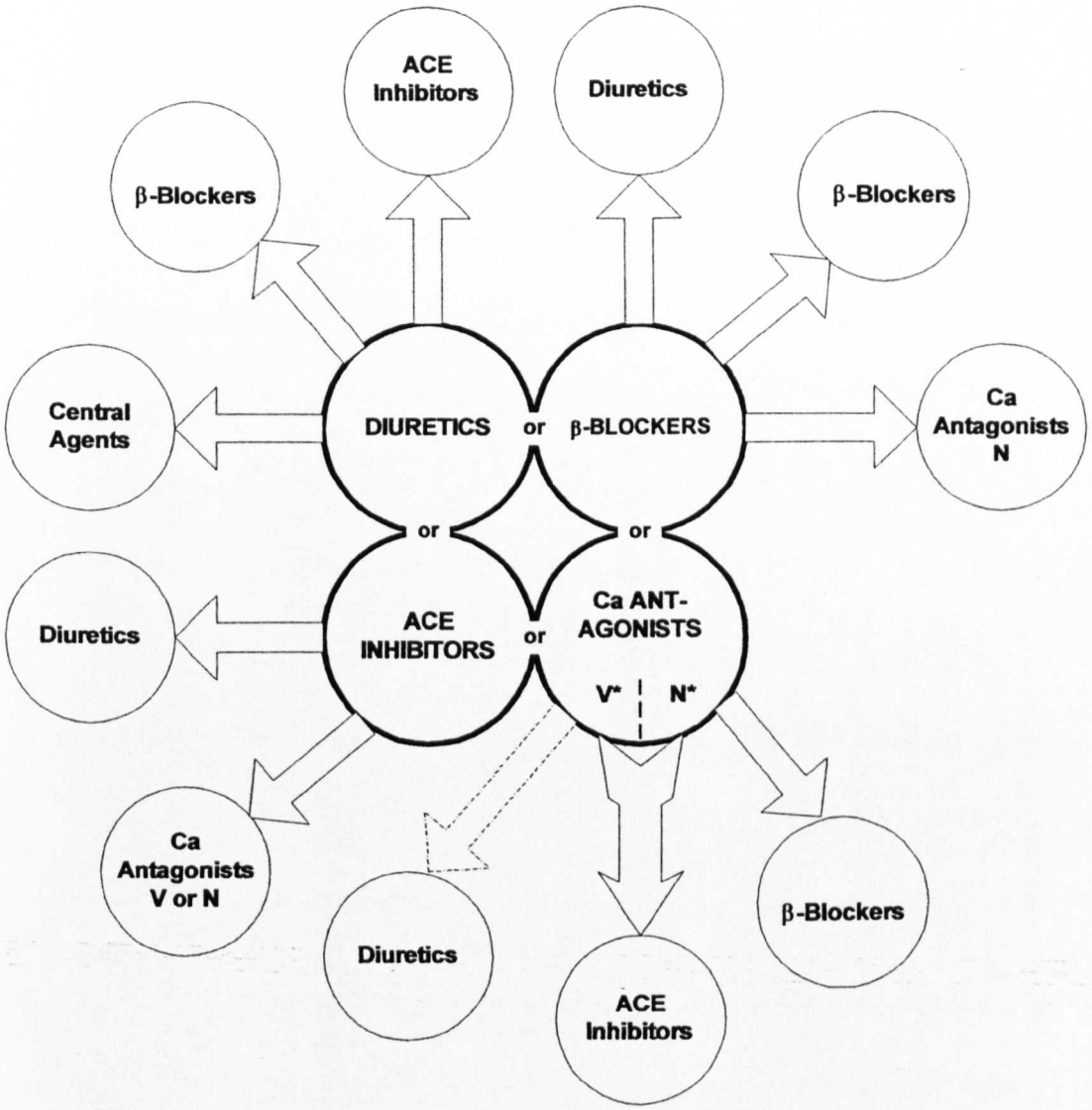
2. To treat hypertension the doctor may choose from well over one hundred drugs, encapsulated within five/six[6] major therapeutic categories:

"***The six main drug classes used, world-wide, for blood pressure lowering treatment are: diuretics, beta-blockers, calcium antagonists, ACE inhibitors, angiotensin II antagonists, and alpha-adrenergic blockers***" (WHO-ISO, 1999: 166); (see Figure 2.1 and Appendix Two):

- Diuretics: *Increase the excretion of water and salt through the kidneys, lowering blood volume and blood volume pressure, and relax blood vessels.* Thiazide diuretics were launched in 1957.
- Beta Blockers: *Slow the heart and reduce the force of its contractions.* Propanolol, the first appeared Beta Blocker, was launched in 1966.
- Calcium Channel Blockers (CCB): *Relax blood vessels.* Nifedipina (Adalat) was the first category of CCBs in the market in 1979.
- Angiotensin Converting Enzyme (ACE) inhibitor: *Relax blood vessels by turning off production of angiotensin II, a chemical that causes the arteries to constrict.* Captopril (Capoten) was the first category of Angiotensin Converting Enzyme (ACE) inhibitor in the market in 1981.
- Angiotensin II Antagonists: *Relax blood vessels by blocking the action of angiotensin II.* Losartan (Cozaar) was the first of Angiotensin II Antagonists launched in the market in 1994).

[6] The alpha-adrenegic blockers are also a therapeutic class that has been mentioned. However, these drugs are not prescribed in Portugal.

Figure 2.1: Antihypertensive Therapeutic Approach



Some researchers argue that doctors' prescribing variation derives from the variety of therapeutic categories which work by a different mechanism of action, encapsulate many brand-name drugs, and differ significantly in terms of cost: "*The volume and cost of prescribing varies considerably between practices. This variation is at least in part due to the prescribing behaviour of individual doctors, who are often faced with a range of therapeutically equivalent generic and brand-name drugs*" (Roberts et al., 1997: 13).

To avoid variances in the volume and cost of different patterns of prescribing, various medical bodies in different countries have launched a plethora of guidelines[7] to provide advice to doctors treating high blood pressure (WHO-ISO, 1999; WHO, 1996; WHO-ISO, 1993). However, these medical guidelines do not avoid the marked differences that were found among the major European countries in terms of patterns of prescribing (O'Brien, 1984). Thus, established patterns of prescribing and their variations have been analysed (Stern, 1997). Health authority hypertension guidelines and medical opinion leaders' comments and suggestions on those guidelines have provided an interesting dialectic reflection on issues of drug choice. From this perspective, these guidelines can be thought of as "philosophies of prescribing", which have encountered support from some medical opinion leaders and opposition from others.

The reading of several medical books for the practical management of hypertension (Schachter, 1997; Birkenhager, 1996; Beevers and MacGregor, 1995; Kaplan, 1994) Houston, 1992) suggests the existence of *two opposing **philosophies of prescribing***, which we will classify as:

- ***The Stepped Care approach***; and
- ***The Liberal approach***.

[7] The purpose of the guidelines is to assist practitioners in clinical decision-making, to standardise and improve the quality of patient care, and to promote cost-effective drug prescribing. These guidelines attempt to define principles of practice which should produce high quality patient care (Veterans Health Administration, 1996).

The ***Stepped Care*** approach is mainly related to the pharmacological values developed by the medical community during the 70's and early 80's, and at the time "*had the merit of introducing some system into the prevailing chaotic approach to treating the hypertensive subject*" (Birkenhager, 1996: 156). This strategy of antihypertensive drug treatment postulates that therapy should be simple, starting generally with a single drug, in most cases a thiazide ***diuretic*** (Opie, 1998). That is, "*efficacy, side effects, and cost considerations are key components of decision making in prescribing an antihypertensive agent. Thiazide and related diuretics have the longest and best-established track record of all antihypertensive drugs*" (Monane et al., 1995: 1049). This therapeutic category would be prescribed at a low dosage and only later, if necessary, would progress to a more elaborate regime, such as ***beta blockers***.

During the 80's a range of new drug therapeutic categories, particularly ***calcium antagonists*** and angiotensin converting enzyme (***ACE***) ***inhibitors***, became available.

In view of these expanded options, treatment guidelines were liberalised, and in due course the ***stepped-care approach*** appeared to some members of the medical community to be too rigid and patronising.

This ***liberal approach*** states that "***A more pathophysiologic and individualised approach to drug therapy for hypertension is recommended rather than the traditional stepped care approach, which has emphasised predominantly diuretics and β-blockers***" (Houston, 1992: 1338).

2.7 Patterns of Prescribing and Patient Characteristics

Examination during the last decade of prescribing patterns for hypertension indicated that ACEIs represent the most important drug class with a 32% share of prescriptions followed by calcium channel blokers (CCB) (24%)[8] (see Appendix Three). While ACEIs and CCBs have shown significant prescription growth over the last 10 years (Maclure et al., 1998), prescriptions for diuretics and beta blockers, as well as other conventional drugs, have been on the decrease (Moser, 1998). This is consistent with the current literature on patterns of prescribing which has shown a decreasing reliance on diuretics and beta-blockers, and an increasing reliance on ACEIs and CCBs (Nichol et al., 1997; Monane et al., 1995). Meanwhile, investigators from the Gruppo Italiano di Farmacovigilanza nell'Anziano (GIFA) reported that: "*Inhibitors of angiotensin-converting enzyme (ACE) have gained a leading role among antihypertensive drugs, whereas use of calcium-channel blockers increased until to 1993 and had declined thereafter. Use of diuretics declined between 1988 and 1991, did not change until 1995, and then rose to 41.5% in 1997, compared with 42% and 39.5% for ACE inhibitors and calcium-channel blockers, respectively. The frequency of use of beta-blockers was uniformly low* (Incalzi et al., 1998: 1557). Although Portuguese health authorities recommend the use of ***beta blockers*** and ***diuretics*** for ***first-line drug therapy***, recent studies have identified low levels of prescribing (McAlister et al., 1997):

[8] Confidential data - Novartis, 1997.

- Only 12% of the patients with hypertension were given ***beta-adrenegic blocking agents*** and this figure reduces to 11% on patients receiving thiazide diuretics.
- Of the patients who were prescribed an antihypertensive drug other than a ***diuretic*** or ***beta-adrenegic blocking agent*** as first-line drug therapy, less than half (43%) had a documented contraindication to ***diuretics*** or ***beta-adrenegic blocking agents*** (BBs).
- Although ***beta blockers*** have been known to reduce mortality and coronary heart disease after myocardial infarction, their use has been associated with a higher risk of side effects than other drug regimes.

Within Britain, ***diuretics*** and ***BBs***, which have been available for more than 25 years, are the most commonly prescribed classes (Smith, 1991b). These therapeutic categories have been found to be related to cost effective prescribing practices and defined by medical guidelines as adequate quality at a lower cost: "*At present, for most hypertensive patients who require therapy (including patients with type 2 diabetes), drugs other than diuretics or beta-blockers should be selected infrequently* (Cutler, 1999: 605). However, some medical researchers argue that those guidelines are "***compromised by a hidden "political" agenda based on cost-oriented considerations***" (Birkenhager, 1996: 156). Meanwhile, there is no doubt that "***the choice of drug should be tailored to the individual patient. Factors to take into account include coexisting disease and side-effects***" (Mayor, 1994: 31). The presence of a concomitant disease that can be improved or worsened by antihypertensive treatment, should be a major consideration in the choice of initial drug (Incalzi et al., 1998)

2.8 Research Dimensions

The purpose of the previous discussion was to illustrate further the relevance to an understanding of the major differences that can be found on drug choice. The two main issues that clinicians are facing are, first, what medical regimen to choose, and, second, what therapeutic class is better to initiate the treatment[9]. The answer is not easy because all five therapeutic categories have specific advantages and disadvantages for particular patient groups, and there is no evidence as yet that the main benefits of any drug class are drug specific rather than related to the reduction of blood pressure per se (Schachter, 1997).

According to the previous assumptions and by drawing upon the principal ideas expressed earlier, *two main dimensions* of substantive research interest are:

1. **GPs' clinical values in the treatment of hypertensive patients**; and
2. **Antihypertensive "philosophies of prescribing".**

The former determine the choice of the therapeutic category while the latter give the patient's clinical structure that guides GP prescribing behaviour. It is argued in this thesis that these two major dimensions have paramount importance on doctors' first-line drug therapeutic approach. Therefore, ***they***

[9] ***"Until recent years, relatively few studies were done to compare drugs, largely because the pharmaceutical industry, which finances much of the research on hypertension drugs, was not eager to pay for them"*** (Grady, 1998: 9).

represent a substantive area of research and a new route to fill a gap within the literature on doctors' prescribing behaviour. Furthermore, they avoid the use of a '***patient scenario approach***' which has been found not the best solution for eliciting doctors' therapeutic cognitive structures (Chinburapa et al., 1993; Bradley, 1991).

2.9 Summary

In Portugal, medical treatment is often equated with drug-based therapy. Over the years there has been considerable interest in the variations in patterns of prescribing. Lack of consensus among doctors about the best way to treat hypertensive patients may help to account for the unexplained variations as general practice lacks accepted standards of appropriate prescribing.

The current emphasis on ensuring a scientific basis for drug choice has been directed at evaluating interventions such as educational inputs and clinical guidelines, that attempt to change prescribing behaviour in Portuguese GPs (Therapeutic Bulletin; 1998; 1997; Silva, 1997; Infarmed, 1996; 1995). As a result, the Portuguese pharmaceutical business environment has changed dramatically during the 1990's. In order to address the new, complex and threatening Portuguese market conditions, particularly progressive government controls on prescribing and reimbursement (INFARMEDb, 2000), pharmaceutical companies should move from a *sales culture* to a *customer-oriented culture* (Doyle, 1994).

That is, pharmaceutical marketing managers have to identify GPs' philosophies of prescribing that derive from the new medical guidelines. By tailoring the characteristics of new ethical drugs to sub-segments of a specific disease, a pharmaceutical manufacturer could conceivably differentiate its products and obtain price premiums. The achievement of competitive advantage through this route requires not only the accumulation of relevant and innovative information the clinical values that guide first-line drug therapy, but also requires specific information on the individual patient's characteristics that differentiate drug choice.

According to Portuguese antihypertensive guidelines, the first choice for most patients with elevated BP, should be ***diuretics*** and ***beta blockers***, though doctors can use other classes of drugs if the first try does not work (Therapeutic Bulletin; 1998; 1997).

As pointed out earlier, the total increase in expenditure in antihypertensive drugs was mainly due to a shift in drug choice, from the already existing drugs (i.e., ***diuretics*** and ***beta blockers***) to the recently introduced ***ACE inhibitors***. Nevertheless, current recommendations have renewed emphasis on the use of ***diuretics*** and ***beta blockers*** as ***first-line drug therapy***, unless there are special indications for other therapeutic categories. As a result, ***two opposing philosophies of prescribing on the treatment of essential hypertension*** were identified:

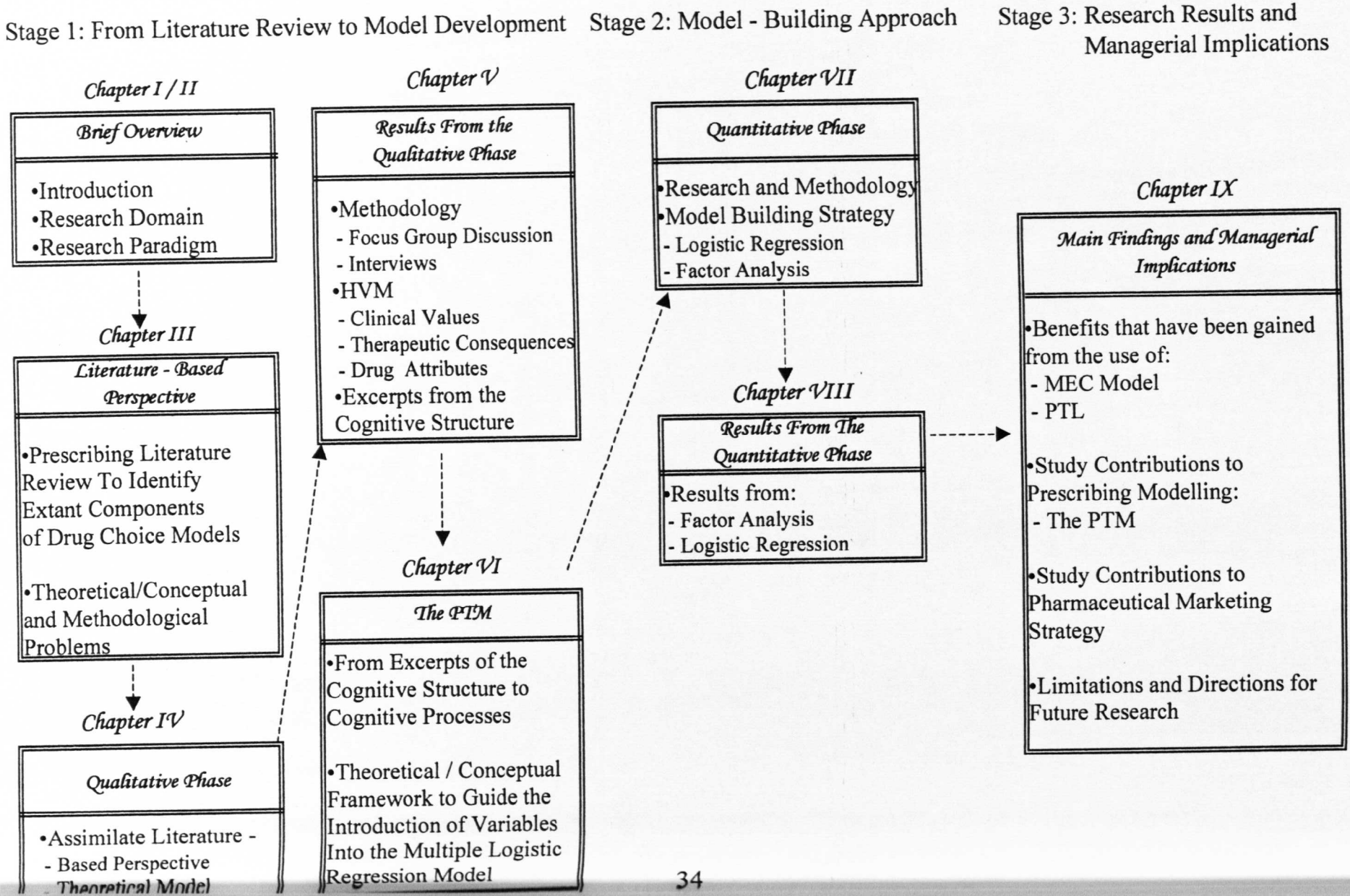
- ***The stepped care approach***; and
- ***The Liberal approach.***

As EU Members experience different health care environments, the nature of factors that influence GPs' prescribing decisions may vary from country to country. Therefore, national studies on doctors' prescribing decisions have been recommended (Haaijer-Ruskamp and Hemminky, 1993). However, ***to date, no information has been published on the factors that influence Portuguese GPs' prescribing decisions.*** As a result, empirical work needs to be conducted in this particular in this EU Member. This empirical work has *two main dimensions* of substantive research interest:

- ***GPs' clinical values in the treatment of hypertensive patients***
- ***Antihypertensive "philosophies of prescribing"***

GPs' clinical values are encapsulated within *prescribing-relevant cognitive structures*, while *philosophies of prescribing* represent *cognitive processes*. On the basis of this two-stage cognitive-oriented approach, we developed a flow chart representing the study overview (see Figure 2.2).

Figure 2.2: Study Overview



3 CHAPTER THREE REVIEW of the LITERATURE

This chapter presents the theoretical models that have been used to explain drug prescribing. These models will be used to differentiate between the different theoretical frameworks that embrace the drug prescribing literature. The models are presented chronologically in order to understand the influence of the consumer behaviour research on the prescribing field. Particular attention will be given to those cognitive models that are always present in any review of the drug prescribing literature.

The chapter, then, presents an evaluation and comparison of the different theoretical models. In evaluating the models, the ten criteria proposed by Zaltman and Wallendorf (1983) for what the desirable properties of a consumer behaviour model should be are used.

In addition, decision-making processes, methods used to study decision-making, and social networks affecting the use of various decision-making strategies will be discussed in order to define the paradigmatic assumptions that underpin the research on doctors' prescribing behaviour.

Finally, the chapter discusses previous studies' main deficiencies and suggests a new research approach to study GPs' prescribing behaviour.

3.1 Introduction

Several researchers have proposed models that attempt to explain the decision-making process that leads a doctor to prescribe a particular drug over another. Some of these models related *external factors* to doctor drug prescribing, while others incorporated or considered the *cognitive processes* underlying doctor prescribing decisions. As a result, the literature review on drug prescribing offers 3 ways of looking at drug choice:

1. as a "black box" with unknown processes going on within, about which only associations of inputs and outputs can be learned;
2. as a consequence of a social system of influence and information flow; and
3. as a consequence of a physician's active effort to make sense of reality and solve clinical problems.

As models of therapeutic decision making, the three research approaches overlap. The first is virtually amorphous (see Hemminki's model). The second emphasizes how information gets to a prescriber (see Miller's model). The third emphasizes how the doctor processes the clinical information (see Cognitive models).

There are areas of incompatibility, however. Neither the first nor the second model acknowledges the individuality of of the prescriber. The first is a fundamentally static view that attempts to explain the physician's behaviour with a set of empirical associations, and that ignores differences in *prescribing-relevant cognitive structures* and *prescribing processes.* The second model views the GP as a passive receiver of information. Finally, *the cognitive approach acknowledges the **active individuality of the clinical problem-solving prescriber***. These differences reinforce the importance of the substantial amount of empirical research that has been conducted concerning the factors and processes which are critical to understanding drug prescribing. However, *the factors and processes influencing doctors' prescribing behaviour are diverse and sometimes contradictory* (Freeman et al., 1993). Given these contrasting findings, *the paradigmatic and theoretical assumptions that underpin the research on doctors' prescribing behaviour have to be reviewed*.

3.2 Paradigmatic and Theoretical Assumptions on Drug Choice

Research on doctors' prescribing behaviour is usually understood as a *problem-solving* and *decision-making* sequence of clinical activities (Bradley, 1991). However, other paradigms have been advanced. In line with this reasoning, we would like initially to clarify the *paradigmatic* and *theoretical assumptions* that support the different models on drug choice.

3.3. Behaviourist Theoretical Models on Drug Prescribing

3.3.1 Hemminki's Model: A Behaviourist Model ?

In her critical review of different factors that influence doctors' prescribing behaviour, Hemminki (1975a) used some behavioural expressions. For example, frequent reference to the "prescribing habits" of doctors may indicate that drug choice is shaped and maintained by its consequences. It follows, then, that the explanation of prescribing behaviour in terms of contingencies of reinforcement (i.e., operant conditioning[1], which is externally controlled) would be distinct from that of the cognitive psychology which has attracted some attention in drug choice research (Lambert et al., 1997; Chinburapa et al., 1993; Denig and Haaijer-Ruskamp, 1992; Chinburapa and Larson, 1988; Denig et al., 1988; Mancuso and Rose, 1987; Segal and Hepler, 1982, 1985; Epsetein et al., 1984; Harrell and Bennett, 1974). However, Hemminky's (1975b) model has no identifiable epistemological location, or theoretical background: ***Hemminki proposed a complex model of prescribing which include many of the influences known to operate and speculated in many others. However, she makes no comment on whether she considers these influences to operate via cognitive or behavioural type processes***" (Bradley, 1991: 283).

[1] "In operant conditioning, the individual emits responses which are repeated at a rate determined by their environmental consequences. Antecedent events do play a role, however, insofar as they signal or set the occasion for the reinforcement contingent on the performance of a specific response" (Foxall, 1993: 47).

Almost twenty years later, Haaijer-Ruskamp and Hemminki (1993) introduced a few alterations to Hemminki's (1975b) model whilst maintaining the substantive theoretical approach.

However, the "new model" revealed the influence of Ajzen and Fishbein's (1980) cognitive[2] approach to consumer behaviour. The influence of other health professionals on doctors' decision-making and consequent prescribing behaviour was a further indication that the initial behavioural model (Hemminki, 1975b) was incomplete. In line with this reasoning, Hepler et al. (1981) pointed out that "***No studies of prescribing that used a behaviorist model have appeared, although some terminology (prescribing habits) suggesting a behaviorist view is occasionally seen and implicitly behaviorist interventions are commonplace***" (Hepler et al., 1981: 34).

3.3.2 Hemminki's (1975b) model

Hemminki (1974) considered that doctor's prescribing behaviour is influenced by several factors, which can be divided into two groups:

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[2] Cognitive psychology tends to de-emphasise the role of the environment as a source of stimuli of behaviour. Whilst not denying the environment as the inevitable source of external stimuli, cognitive psychologists place more stress on and devote a greater proportion of their effort to the investigation of internal stimuli, i.e. those intra-personal, mental events and processes which are consequent upon environmental inputs, through which the recipient individual's experience is constructed and by which contingent responses are initiated. *"The underlying model viewed the mind as an internal realm of operations and computations, to be revealed by experimentation and the systematic manipulation of specifiable inputs and outputs to the cognitive 'black box'"* (Gillett, 1995: 112).

1) Factors easily modified by administrative measures, such as pharmaceutical promotional activities, education and extent of control; and

2) Factors not easily modified by administrative activities such as the characteristics of patients and doctors, and the doctor-patient relationship.

Based on these two sets of influences on doctors' prescribing behaviour, which were described on her studies (Hemminki 1974; Hemminki 1975a), Hemminki (1975b) developed a model to analyse whether the prescription of drugs displaced other forms of therapy.

Adopting the method of behaviour simulation (Hemminki, 1975b), a questionnaire was sent by post to a sample of 100, randomly selected GPs. Doctors were requested to provide their therapeutic choices regarding the hypothetical patients described in the questionnaire sent to them. From these 100 GPs, 72 presented their prescribing solution. Although most of these standard patient cases were formulated in such a way that they could be easily treated without any drug, most of them were received a drug-based solution. In accordance with these findings, the researcher stressed that no alternative form of treatment was suggested. The obvious conclusion was that the role of prescriptions in therapy displaces more adequate and casual therapeutic approaches (Hemminki, 1975b). These results reinforced her conviction that *research* and pressures developed by the *pharmaceutical companies* were the major influences on doctor's

prescribing behaviour. Nevertheless, Hemminky (1975b) suggested that the level of influence of the pharmaceutical companies would depend not only on doctors' personal characteristics and their working conditions, but also on their therapeutic opportunities. Hemminky (1975b) pointed out that these findings were in line with her previous review of the literature on the factors affecting drug prescribing in Western countries (Hemminki, 1975a). In this review, she suggested that the role of pharmaceutical industry on doctor's prescribing behaviour was particularly important, and was wide-spread through different sources of information. Factors like education, advertising, colleagues, control and regulation measures, demands from society and patients' and doctors' characteristics were found to perform a decisive role in decisions about drug therapy. The Hemminki (1975a) approach to contextual factors (i.e., factors easily modified by administrative measures), such as pharmaceutical advertising, medical education and extent of control, was particularly interesting when assessing prescribing behaviour and suggesting prescribing interventions.

Based on previous studies (Hemminki 1975a, b; Hemminki 1988), Haaijer-Ruskamp and Hemminki's (1993) model was organised around two types of factors: ***the condition*** and ***the influence factors***.

Haaijer-Ruskamp and Hemminki (1993) argued that the medical care process was influenced at the macro-level by the national health care

system (conditioning factors). These social scientists defined four main conditioning factors:

a) The tradition and education of the population, which may mould both the expectations of the patients and the views of the physicians;

b) Medical teaching and professional thinking, which define the concepts of health and illness and thus determine the use of physicians services;

c) The level and distribution of wealth in a country and the ideology and power of the state, since these can affect the organisation, regulation and availability of both professional care and drug supply; and

d) The power and vitality of the pharmaceutical industry.

Haaijer-Ruskamp and Hemminki (1993) suggested that the condition factors may act on the influence factors from time to time and from country to country. These condition factors were also found to have an overall influence at the micro-level. Three major individual factors that penetrate to the micro-level to influence drug choice were reported:

1. The demands and expectations of pressure groups and society at large;
2. The influence of the pharmaceutical industry and research results; and
3. The control measures and regulations imposed by the health authorities.

Haaijer-Ruskamp and Hemminki (1993) suggested that the power, the influence, and the penetration of these three major pressure groups on the

factors influencing doctors' prescribing behaviour was exercised mainly through intermediaries. Their influence was particularly relevant during pre and pos-graduate medical education, as indicated in a previous study (Hemminki, 1976). Some opinion leaders as colleagues, consultants and other health professionals were also mentioned as sources of influence on doctors' drug choice. However, at the micro-level, the influence factors on doctors' prescribing behaviour were mainly related to doctors' therapeutic decision making.

Cultural values and beliefs about health and illness were also found to influence the micro-level (Haaijer-Ruskamp and Hemminki, 1993). In their model, the individual patient's personal characteristics, demands and expectations were important to the therapeutic approach. These researchers suggested that these factors represent direct biunivocal influences. That is, the factors were found to mould doctors' therapeutic approach, but at the same time the social context in which they were developed and where they are active, also determines values and beliefs about health and illness.

Haaijer-Ruskamp and Hemminki (1993) concluded that the nature of the factors may vary from country to country and thus national studies are needed.

3.3.3 Miller's (1974) Model

Miller's (1974) model derived from Coleman et al.'s (1966) work on new drug adoption, particularly in relation to the sequence of sources of drug information. Three major divisions were proposed in Miller's model:

Box 3.1 : Miller's Model

1 - Antecedents:	2 – Process:	3 – Results:
Factors present in the situation prior to the introduction of a new drug (i.e., the structural reality): the doctor's *identity* and the doctor's *perception of the situation.*	The process through which an individual passes from first hearing about an innovation to actual purchase or use of the innovation.	The confirmation of the new drug as a first-line drug therapy, which can be continuously used or discontinued at a later date, indicates its market success.

1) Antecedents

The doctor's *identity* was subdivided in four main topics:

- *Integration in social networks*
- *Personal characteristics*: this item included different variables such as age, community experience, medical school and orientation and attitudes.

- *Practice characteristics*: variables like type of practice, office sharing, size of practice, patients' income, level of use of class of drugs and medical staff membership were included in practice characteristics.
- *Communication behaviour:* it includes sources of drug information, colleagues, and manufacturers' representatives.

The doctor's *perception of the situation* embraces three variables:

- Cultural and social variables
- Patient variables
- Organisational influence

2) Process

The process stage is divided into two main categories:

- Information Sources; and
- Attributes of Drug Innovations.

Miller (1973/Part I-III) argued that *sources of drug information* and *characteristics of the innovation* seem to be the most important variables during the adoption process. Five major stages were defined:

I) *Awareness Stage*

The awareness stage is the starting point from which a doctor simply becomes aware that a new pharmaceutical product was introduced in the market. If this new product is a radical drug innovation it is probable that he/she will bypass the awareness stage and go directly to the adoption stage. However, the awareness stage is mainly characterised by a lack of motivation in terms of information about the new drug. The role of different sources of information such as manufacturers' representatives, journal advertising, medical journal articles, direct mail advertising, samples, and meetings were considered very important in this stage. However, "*after initial awareness is created, professional sources of information are used increasingly*" (Miller, 1973: 494).

II) *Interest Stage*

If for any reason doctor becomes interested in the use of the new drug he/she begins to actively seek information about it in order to decide whether to adopt it or not. However, the doctor's personality and the social network to which s/he belongs influences not only the choice of drug information sources, but also how sources are used. Miller (1973) pointed out that the manufacturer's representative, journal advertising, journal articles, colleagues, and doctor's desk reference are relevant at this stage as they increase the level of knowledge about the new drug.

III) *Evaluation Stage*

The evaluation stage was considered important in deciding whether the new drug will be prescribed. This final judgement may be reinforced by the clinical opinion of colleagues or local consultants with whom doctors exchange clinical information. The importance and influence of these sources of drug information is supposed to increase if the doctors' perception of the new drug risk is high.

Medical articles and clinical meetings are further sources of information important in the evaluation stage.

Since most "new products" are introduced for purely commercial reasons (Lumbroso 1981), doctors may decide not to prescribe the new drug (Miller, 1974).

When doctors realise that a new drug is not a radical innovation, and only small modifications were introduced, they usually weigh up the advantages and disadvantages of discontinuing the older drug.

Undesirable effects of the old drug are judged against the advantages offered by the new drug therapeutic approach. If the advantages are considered important, doctors are then expected to initiate the trial stage in a limited number of patients.

IV) *Trial stage*

In the trial stage doctors actively seek information, particularly through the physician's desk reference (PDR), journal advertising, house organs (i.e., journals that are published by pharmaceutical manufacturers), direct mail advertising, and samples. Pharmacological characteristics such as side-effects, daily dosage, and efficiency are evaluated in order to prescribe the new drug to a small number of patients.

V) *Adoption Stage*

The adoption stage is the confirmation of an interest in the new drug as a first-line drug treatment. The extent to which the drug therapeutic approach will be enriched with this new compound depends on doctors' perceptions of advantages and risks: "*Patients previously given the new drug's predecessors may or may not be switched to the new drug depending on the relative advantages of the new drug and the risk involved in making such a change*" (Miller, 1973: 494). To evaluate the new drug's advantages and risks Miller (1974) noted that doctors preferred more scientific or professional sources of drug information. Doctors' colleagues were found to be important in drug adoption, particularly when called upon to treat difficult conditions in which the effects of therapy are less clearly defined. Doctors sharing an office with another peer were found to use the colleague as a source of information for drugs not presently prescribed by the physician.

3) Results

The confirmation of the new drug as a first-line drug therapy, which can be continuously used or discontinued at a later date, indicates its market success (Miller, 1974). If the new drug meets the doctor's needs and expectations it will become a first-line drug therapy. If the opposite is true, two options are faced: to reject or re-evaluate the situation. The re-evaluation of the situation may transform non-adoption into later adoption or into continued non-adoption.

Miller (1973; 1974) pointed out that the length of time that elapses between first hearing about an innovation and adopting it, define

s the type of adopter. However, the rate of innovation diffusion was reported to be dependent both on the *antecedents* and on the *process* (Miller, 1974). The complexity of all the factors included within the *antecedents* and *process* stages and their dynamic nature suggested that

"*they are far from being the relatively simple mechanism that many people have thought them to be*" (Miller, 1974: 89).

3.4 Cognitive Theoretical Models on Drug Prescribing

The concept of attitude has played a major role in both social psychology and consumer behaviour studies because attitudes reflect how people are perceiving and interpreting objects and events around them (Foxall and Goldsmith, 1994). For this reason, attitude is probably the most basic and widely accepted concept throughout the social sciences. Given the great progress that has been made in the past two decades in understanding the nature of attitude and its relation to behaviour (Ajzen and Madden, 1986; Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975; Fishbein, 1967; 1963), this concept is of a particular interest to marketing strategists. Knowing how consumers evaluate products, services, and promotional campaigns is extremely important for marketing managers: "***Measuring and understanding consumer attitudes allow marketers to develop the products consumers want, promote these products effectively, and evaluate their efforts at promotion***" (Foxall and Goldsmith, 1994: 93). Thus, through a knowledge of consumer attitudes marketing managers can determine the best segmentation of the market, the correct product positioning and the appropriate communication strategy (Chisnal, 1985). One of the most systematic and widely used approaches to attitude conceptualisation and measurement in marketing has been ***The Theory of Reasoned Action*** (TORA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975).

Following this trend, several researchers have proposed models that attempt to explain doctors' prescribing behaviour (Knapp and Oltjen, 1972; Miller, 1974; Harrell and Bennett, 1974; Hemminki, 1975; Lilja; 1976; Epstein et al., 1984; Chinburapa et al., 1987; Denig et al., 1988; Segal and Hepler, 1982; 1985; Denig and Haaijer-Ruskamp, 1992; Chinburapa et al., 1993; Lambert et al., 1997). It was recognised that "***Most of the proposed cognitive models were generally based on the expectancy-value theory that stated that a physician's drug choice is a function of the subjective beliefs that certain outcomes will occur from various drug choices and the values attached to those outcomes***" (Chinburapa et al., 1993: 1473). The expectancy-value models[3], particularly TORA (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980), has been the preferred theoretical framework: "***Most published studies have attempted to model the internal processing of physicians as they make prescribing decisions, and most have used expectancy-value type models such as the theory of reasoned action***" (Lambert et al., 1997: 1768). For example, Harrell and Bennett (1974) developed a deep discussion regarding the use of expectancy models in attitude measurement to predict and understand drug choice. Some of these models related external factors to drug choice, while others incorporated mainly the cognitive processes underlying prescribing decisions.

[3] "*Expectancy-value models are designed to represent how people actually integrate multiple pieces of information to arrive at an overall judgement*" (Bagozzi, 1982: 562-563).

In line with the reasoning that has been advanced, it is possible to argue that in the last two decades the Fishbein and Ajzen's (1975) and Ajzen and Fishbein's (1980) theoretical framework relating the conceptualisation of attitude influenced most of the research on doctor's prescribing behaviour. This theoretical framework was considered particularly relevant to GP prescribing research (Sampson and Palmer, 1973). Chisnall has the same opinion: "***The best results encountered had concerned a very specific problem, viz. research among General Practitioners in connection with drugs for a particular kind of arthritis. In this particular case, there were four factors which contributed to likely accurate behaviour prediction from attitudes: (a) homogeneous "involved" population, (b) high interest attitude object, (c) specific situation nominated, and (d) more rigorous data collection methods*** (Chisnall, 1985: 83).

Given the importance of TORA not only to prescribing behaviour research, but also to purchase generic prescription drugs (Brinberg and Cummings, 1984), an initial presentation of this model of social behaviour is required.

3.4.1 The Theory of Reasoned Action

The theory of reasoned action (TORA) (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975) has been systematically and widely used in a variety of experimental and naturalistic settings for more than two decades (Foxall and Goldsmith, 1994; Ajzen and Madden, 1986). Its longevity and acceptance for explaining social action have been recognised by

prestigious researchers: "*One mark of the success of any theory is its longevity. By this measure, the theory of reasoned action (e.g., Ajzen and Fishbein 1980; Fishbein and Ajzen, 1975) has achieved due recognition as a fundamental model for explaining social action*" (Bagozzi, 1992: 178).

According to the theory, attitudes should be placed within a sequence of linked cognitive constructs: beliefs, attitudes, intentions and behaviour. The TORA model specifies not only relationships between these motivational constructs, but also includes the social aspects of attitude formation (Miniard and Page, 1984). Moreover, the approach implicit in TORA has proved especially attractive as regards the problem of attitude-behaviour consistency (Foxall, 1984a; b; c; 1983; 1981).

In the past, attitude items specified only the target object of the attitude. As a result, Fishbein defined attitude as "***the amount of effect for or against a psychologic object***" (Fishbein, 1967: 478). The Fishbein (1967) notion of attitudes toward actions (*act)* as opposed to the more traditional attitude focus on *objects* was an important revolution in the conceptualisation of and distinction among variables. Furthermore, the "*attitude toward the act"* was considered to be one expression of Fishbein's (1967) general movement toward conceptual sophistication. Given this complex set of concepts, an extension of Fishbein (1967) reflection was developed, and a "new" theory was born: ***The Theory of Reasoned Action*** (Ajzen and

Fishbein, 1980; Fishbein and Ajzen, 1975). Therefore, TORA has been presented as an extension of earlier research on expectancy-value models of attitude (Fishbein, 1967; 1963). A particular interest in rational, volitional behaviour (i.e., behaviours that can be controlled by individuals) can be found in Fishbein and Ajzens (1975) subsequent research. The assumption that most actions of social relevance are under volitional control is of particular interest because it enables these theorists to claim emphatically that a person's ***intention*** to perform (or not perform) a behaviour is the immediate determinant of the action. The behaviour under volitional control was assumed to be dependent on an actor's attitude towards the behaviour.

Another revolution in conceptualisation was the redefinition of the usual cognitive component of belief, which was assumed to be "***the subjective probability of a relation between the object of the belief and some other object, value, concept, or attribute***" (Fishbein and Ajzen, 1975: 131). The conative component of attitude was termed behavioural intention, defined as "***a person's location on a subjective probability dimension involving a relation between him and some action***" (ibiden, p.288). The importance of the separation of the components of attitude was developed in order to obtain a causal chain involving attitude, intention and behaviour. Fishbein and Ajzen (1975) claimed that there is a strong relationship between behaviour and

behavioural intent only when a very explicit situation-specific intention is present. In this way, *behaviours* (i.e., volitionally controlled behaviours) were assumed to be a consequence of behavioural intention, which in turn was a function of attitudes towards the acts in question, and influenced by normative beliefs. This social-normative factor represents "***one's judgements about the expectations of particular significant others and one's motivation to comply with those expectations***" (Fishbein and Ajzen, 1975: 302). That is, in addition to providing a model which focuses on attitudes toward actions and resultant consequences, Fishbein and Ajzen's (1975) model includes a measure of the social consequences (i.e., the subjective norm). In line with this reasoning, the researchers argued that attitudes were functionally linked to beliefs.

The conceptual sophistication of Ajzen and Fishbein (1977) model assumed that attitudes and behaviours are realities "***consisting of four different elements: the action, the target at which the action is directed, the context in which action is performed, and the time at which is performed***" (Ajzen and Fishbein, 1977: 889). The major conceptual argument supported by Ajzen and Fishbein (1977) was that attitudes should predict behaviours best under conditions of high correspondence. That is, the elements constituting attitude and behaviour should be the same (Ajzen and Fishbein, 1980). Furthermore, these elements should be defined at the same level of

specificity for high correlations to appear empirically. These authors assumed that behaviours were items just like those contained in attitude scales. Thus, any particular behaviour should be subjected to psychometric analysis. Researchers who investigated the Fishbein and Ajzen's (1975) theoretical framework argued that "*the model has been shown to have predictive validity in a real-world marketing application*" (Ryan and Bonfield, 1980: 92).

Generally speaking, the TORA embraced the assumption that individuals are usually quite rational and make systematic use of the information available to them. Such reasoning strengthens the Fishbein and Ajzen's (1975) argument that people consider their actions before they decide to engage or not engage in a given behaviour. That is, the behaviour is assumed to be a consequence of the intention to act. As a result, the model recognised that behavioural intention was a function of:

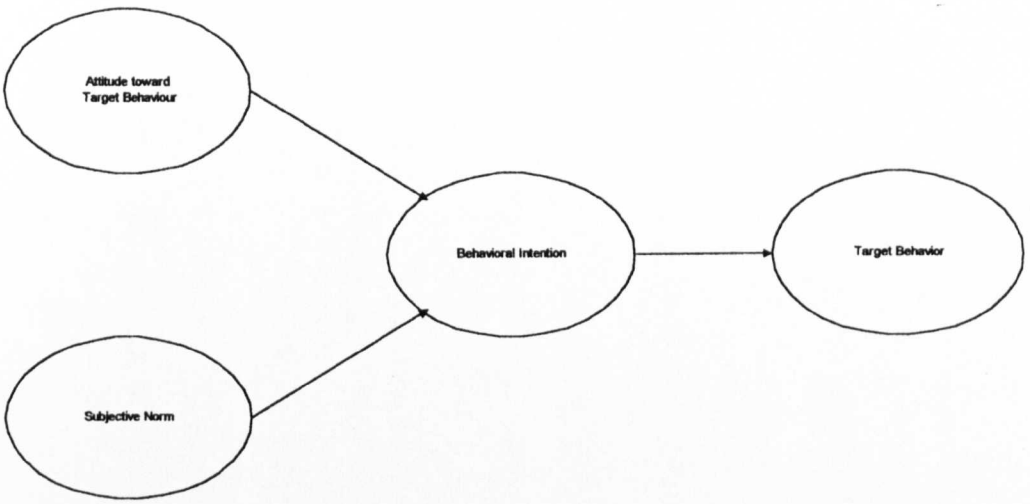
(1) Probability beliefs about outcomes of behaviour;

(2) The subjective desirability of the outcomes; and

(3) Normative beliefs (i.e., beliefs about the social acceptability of a behaviour).

The pre-behavioural posture results from a person's attitudes toward performing the behaviour in question and the person's subjective perception of the norm concerning the behaviour.

Figure 3.1: ***The Theory of Reasoned Action***



Source : Derived from Fishbein, M. and I. Ajzen (1975). *Belief, Attitude, Intention, and Behaviour : An Introduction to Theory and Research* , Reading, MA : Addison-Wesley

That is, the behavioural intention is a function of two basic determinants, one personal in nature and the other reflecting social influence. Thus, the person's intention to behave in a certain manner was represented by a linear regression function of two main dimensions:

a) attitude toward the target behaviour (personal in nature); and

b) normative pressures that regulate behaviour (social in nature).

At the most basic level of explanation, it could be argued the TORA embraces behaviour as a function of salient information, or beliefs, relevant to the behaviour. Two kinds of beliefs were distinguished, ***behavioural beliefs*** and ***normative beliefs***. The former were assumed to influence attitudes toward the behaviour, while the latter was faced as the

underlying determinants of subjective norms. The TORA faces each behavioural belief as a bridge between behaviour and a certain outcome.

Fishbein and Ajzen (1980) pointed out that individual ***external variables*** such as personality traits, intelligence and demographic characteristics, or social ***external variables*** such as status and the level of socialisation were not necessarily related with behaviour. Nevertheless, these external variables were assumed to be important in terms of the influence they have on the person's beliefs or on the relative importance attached to attitudinal and normative considerations. Thus, the effect of these external variables on behaviour was assumed to be a function of its influence on the determinants of that behaviour. That is, the TORA "***stresses the importance of antecedents of attitudes and subjective norms, which in the final analysis determine intentions and actions***" (Ajzen and Madden, 1986: 454).

In line with the reasoning that has been advanced, it is possible to stress that the theory of reasoned action "***deals mainly with the factors that intervene between external variables and behaviour*** (Ajzen and Fishbein 1980: 9). For this reason, the theory's validity does not depend on support for hypotheses concerning the effects of external variables but on empirical support for the relationships and the relative importance of attitudinal and normative considerations as determinants of intentions. Thus, each of the two components of intention to behave can be further specified.

The beliefs that underlie people's attitudes toward the actual performance of the behaviour (behavioural beliefs) depend upon what the person believes will happen if he or she performs the behaviour. This also takes into account the individual's evaluation of the consequence:

- Attitude toward performing the behaviour = The belief that the behaviour leads to a specific consequence (i.e., the individual's evaluation of that consequence)

Symbolically, AB = Σ biei, where "b" is the belief that performing behaviour "B" leads to consequences or outcome "i", "e" is the person's evaluation of outcome "i", and "Σ" is the number of beliefs the person holds about performing behaviour "B".

The subjective norms are also a function of beliefs, but beliefs of a different kind, which take into account how motivated a person is to comply with that reference group's norms. These ***normative beliefs*** embrace the person's beliefs that specific individuals or groups think he or she should perform the behaviour in question. Thus:

- The Subjective norm concerning the behaviour = The normative beliefs about the behaviour (i.e., the individual's motivation to comply with those norms).

Symbolically, SNB = Σ bimi, where "bi" is the normative belief (i.e., the person's belief that reference group or individual "i" thinks he or she should or should not perform behaviour "B", "mi" is the motivation to comply with the referent "i", and "∑" is the number of relevant referents.

Both the two sets of external factors can be known and be stable across the range of behaviours which are to be explained. Therefore, it is possible to argue that the intention to assume a particular course of action is a function of the sum of the motivations weighted with the strengths of the beliefs. Facing a new situation, with some particular characteristics, the individual activates a subset of beliefs from his/her cognitive structure. Along with the consequent motivations to comply with the opinion/advice of the main referents, this will determine a certain behavioural intention or preference and behaviour. These two conceptually independent components of intention, ***the attitude toward the behaviour*** and the ***subjective perception of the norm*** are responsible for the final behaviour. The former refers to the degree to which a person has a favourable or unfavourable evaluation of the behaviour in question, while the latter predictor of intention is a social factor, which is responsible for the perceived social pressure to perform or not to perform the behaviour. When any situation of conflict between the attitude toward the behaviour and the subjective norm occurs, the relative importance of each factor will

determine the behaviour. The outcome will be a function of the context. For some behaviours the attitude someone has towards performing that behaviour will be more important than the subjective perception of the norm concerning that behaviour and will carry more weight in determining the behavioural intention. For other behaviours the subjective perception of the norm will be more important.

In short, expectancy-value models, particularly Fishbein and Ajzen (1975) and Ajzen and Fishbein's (1980) theory of reasoned action, have been extensively applied to consumer behaviour, and its presence in several studies on doctor's prescribing behaviour is confirmation of its high level of importance for pharmaceutical marketing. According to this view, doctors process information and consequently form beliefs about an object or the consequences of some action; associated with each belief is the individual's evaluation of the information, and the two are combined together to arrive at an overall judgement. Depending on one's school of thought, this judgement is either synonymous with the person's attitude, or is distinct from, but causally related to the attitude, and represents the cognitive structure upon which it is based. Therefore, it is of relevance to the research community on doctors' prescribing behaviour, that this literature review was able to distinguish clearly between the TORA and other expectancy-value models.

3.4.2 Knapp and Oeltjen's (1972) Model

Knapp and Oltjen (1972), in an experimental study of benefit-to-risk assessment in drug selection among GPs and specialists used an "expectancy-value" model to analyse doctors' prescribing behaviour. According to this theoretical framework, the prescription of a particular drug would be a function of doctors' perceptions of:

1) ***The expectancy that a beneficial effect would occur in the patient if the drug were prescribed***;

2) ***The amount of the beneficial effect to be gained***;

3) ***The expectancy of possible side effects***; and

4) ***The magnitude of these side-effects.***

The relative weight given to the four factors was assessed under different levels of severity of hypothetical cases of essential hypertension. Knapp and Oltjen's (1972) study suggested that prescribing decisions were based on subjective expectations about benefit (efficacy), risks (side-effects), and other factors relating to the severity of the illness. The results derived from this analytic framework indicated that ***doctors' characteristics***, particularly their speciality, and the ***severity of the illness*** were major considerations in drug choice. Other variables such as a doctor's status, age, practice site, and prescribing rate were not significantly related to his/her perception of the benefit-to-risk ratio of any particular drug.

3.4.3 Harrell and Bennett's (1974) Model

Harrell and Bennett (1974) were the first researchers to use Fishbein's Behavioural Intention model to understand doctors' prescribing behaviour. These researchers developed their study based on an unpublished paper from Fishbein (1970) which was entitled "***An Investigation of Relationships Evalutive Beliefs, Affect, Behavioural Intention and Behaviour***" (Harrell and Bennet, 1974). Two versions of the expectancy-value model were tested. The classic summative technique which follows Fishbein exactly and is represented by the formula $R_x \cong R_xI = f [B_i a_i] W_1 + [(NB) (Mc)] W_2$ was used:

R_x = prescribing behaviour regarding a specific brand;

R_xI = behavioural intention to prescribe a particular brand in a specific situation;

B_i = belief about the outcomes of the behaviour (i.e., the probability that each outcome is related to the behaviour);

a_i = the evaluative aspect of the possible outcome (i.e., the relative desirability of each outcome);

NB = the normative belief (i.e., the doctor beliefs about what his/her colleagues would advise them to prescribe in that clinical situation;

Mc = motivation to comply with norms (i.e., doctors desire to comply with

what colleagues would advise);

W_i = Beta weights (i.e., standardised partial correlation coefficients) derived from multiple regression;

n = the number of relevant outcomes or consequences to the prescribing act; and

$f = \sum$ as in the Fishbein model, symbolising the extended disagregative form in which each $B_i\ a_i$ provides a separate independent variable in the multiple regression equation.

This approach incorporated two dependent measures, behavioural intention (R_xI), which was measured by a seven-point bipolar scale, and prescribing behaviour (R_x). As both actual behaviour (R_x) data and attitudinal information (R_xI) were available, it was possible to avoid considerable alterations of the situation for each measurement.

Harrell and Bennett's (1974) attempted to create a clinical situation in which, for a given patient with diabetes mellitus, drug choice was analysed and a questionnaire was developed to collect the data. The questionnaire encapsulated a comprehensive list of possible drug outcomes and side effects which had been obtained during a prior group discussion. A statement with the most typical prescribing situation for diabetes patients was also introduced into the questionnaire. This instrument was used to

understand and measure doctors' pharmaceutical brand preference. In addition to the questionnaire, secondary data were obtained from a prescribing panel was also used to test the Fishbein Behavioural Intentions model. The different data were useful to evaluate:

1) The desirability of those outcomes;

2) The probabilities that those outcomes would be attached to five pharmaceutical oral hypoglycemics brands; and

3) The medical, professional acceptability of that drug therapeutic approach.

As mentioned earlier, Harrell and Bennett's (1974) research tested two forms of the expectancy value model:

a) The summative technique which follows Fishbein's three variable model: V_D = (Summed Attributes) W_0 + (Normative Factors) W_1, where V_D = behaviour intent or actual behaviour.

b) The second form followed the alternative disaggregative model, which is represented as a seven-variable model:

V_D = (Attribute 1) W_1 + (Attribute 2) W_2 + (Attribute 3) W_3 + (Attribute 4) W_4 + (Attribute 5) W_5 + (Attribute 6) W_6 + (Normative Factors) W_7, **or**

$R_xI = f\,[B_i\, a_i]\,(W_i) + [(NB)\,(MC)] + (W_7)$.

In both formulae, attributes were not the physical attributes of the product, but were factors derived from beliefs about the outcomes of performing the act (B_i) and the evaluation of those beliefs (a_i).

These researchers advocated that the **second model** was more practical for **marketing managers.** This conviction was based on the advantage of a better interpretation regarding the relative importance of each attribute as a predictor of the dependent variable. Furthermore, the seven-variable disaggregated form of the expectancy value model produced stronger results than its summed form: "***As such, it is a model with some direct application to such marketing decisions as product design, product positioning, and the development of promotional appeals*** (Harrell and Bennett, 1974: 277).

Although a strong relationship was expected, the authors concluded that the relationship between actual behaviour and behavioural intention was not strong (average correlation coefficient being only 0.40). As said earlier, Fishbein's model can be expected to obtain strong correlations between behavioural intention and behaviour when a very explicit situation is defined. Otherwise, it is neither possible to measure attitudes toward that specific action, nor to measure the beliefs and evaluations of the specific outcomes attached to that action. In terms of the doctor's drug choice, "***prescriptions for the same drug might be for two different patients and for somewhat different patient conditions***" (Harrell and Benett 1974: 270). As

a result, a specific patient profile is required in order to attempt to control patient variation. To overcome this problem, these researchers presented doctors with a clinical problem which guided their behaviour: "***One way to attempt to control for this variation is to present the respondent with a situation-specific problem for which the behaviour is directed***" (Harrell and Benett 1974: 270). The patient description provides a specific clinical context which is relevant to the theoretical, cognitive premise that attitudes toward specific actions and not towards brands would provide the best predictors of drug choice. However, this strategy was insufficient for improving the correlation between behavioural intention and actual behaviour. This was reinforced by the significance level, which was an empirical indication that a relationship was present, but that it was rather weak. Therefore, the model was not able to explain a significant amount of the variance in the dependent measure: "***As with most research in buyer behaviour, however, a large portion of the variance in the dependent measure is not explained by the model***" (Harrell and Benett, 1974: 273). These researchers pointed out that multi-brand use and substantial brand switching by doctors over time may partially justify the difference between actual behaviour and behavioural intention. Additionally, they suggested that some specific characteristics of the diabetic prescribing situation helped to explain these weak results. Normative factors were also found unimportant in this study. Their

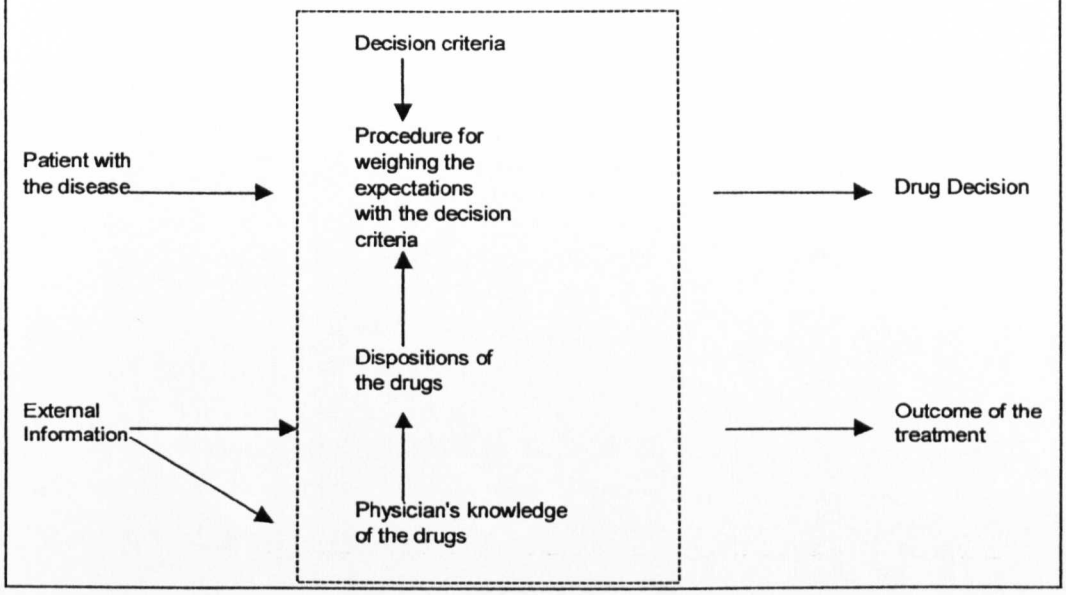
findings also suggested that "***patient conditions vary and often suggest the use of particular brands; the "most typical" patient description situation did not account for this ... different patients often respond differently to different brands, the favored brand might not match the patient's physio-chemical makeup ... the average physician sees approximately six diabetics per month, a number too small to randomize the effects of several variables such as concomitant diseases unlisted on the patient description***" (Harrell and Bennett, 1974: 276). Nevertheless, Harrell and Bennett (1974) stressed that the model was very useful for explaining and predicting drug choice.

3.4.4 Lilja's (1976) Model

In a study for the Swedish government in 1973, Lilja (1976) tried to identify the overall attitude of doctors regarding ten different drugs for treating both diabets and pneumococcal pneumonia. The goal of his research was to understand the doctors' attitude towards pharmaceutical brands. Therefore, the relationship between any one drug and its particular outcomes, under a particular patient description, was analysed.

Data collection regarding antidiabetic and antibiotic prescribing was conducted using a mail questionnaire to a sample of 180 doctors. Bipolar scales were use to evaluate drug interest. One expert group for each disease under investigation was selected in order to evaluate doctors' decision making, as described in Figure 3.2: The Lilja (1976) Model.

Figure 3.2: The Lilja (1976) Model



The outcome of the treatment in terms of its curative effect, side effects, and cost was evaluated in accordance with the Swedish health authorities' suggestion. The relative importance of each of these treatment outcomes was defined by multiple regression analysis. Lilja (1976) found that the curative effect of antidiabetic medication was the best predictor for new drug adoption. The low level of side-effects was the second most important attribute of drug choice. Drug cost however was found to be of little importance to antidiabetic prescribing. Yet was considered more important than side effects when the doctor has to choose an antibiotic to treat pneumococcal pneumonia. As long as the number of satisfactory results with the drug is high, the drug therapeutic approach was found to

follow a habitual choice approach. Lilja (1976) pointed out that non-habitual choice is better for understanding doctors' new drug prescribing behaviour. However, some unsuitable prescribing was found. Doctors' knowledge about drugs and their disposition was found to be important to a rational drug therapeutic approach. External information was also considered important for moulding expectations about drug outcomes.

In the diabetic case, the older doctors differed from the expert group. The researcher pointed out that in this case doctors who read more than two professional journals were found to differ more with the expert group than those doctors who read fewer journals. This surprising result was justified by the fact that clinical trials of this type of drug seldom appear in Swedish professional journals. In the pneumonia case, the number professional journals read had the opposite effect, and doctors with a low number of visits by patients were found to have a similar prescribing behaviour to that of the expert group.

In Lilja's (1976) study a positive relation was also found between the attitudes of doctors towards information from pharmaceutical manufacturers' representatives and information from governmental health pamphlets. The same positive relationship was true of the number of professional journals read and attendance at professional meetings. Three main implications were derived from Lilja's (1976) study:

1. More scientific information was required to communicate the relative advantage of different drugs to doctors.

2. Although important, other criteria besides curative effect were necessary for determining drug prescribing decision-making. In the case of drugs with the same therapeutic effect, comparative drug cost is an example. However, it was found important to involve the doctor in decision-making prior to establishing any type of criteria, otherwise the doctor's acceptance of this decision would be low.

3. Providing price information as a means of influencing drug choice was inappropriate because of the low weight cost it was found to have in the decision process. The results suggested that the curative effect of the drug was a stronger attribute for influencing doctors' drug choice.

3.4.5 Segal and Hepler's (1982; 1985) Models

In their review of drug prescribing, Hepler et al (1981) argued that doctors "***may exchange information with colleagues in a group, but in the psychological view he or she acts alone to choose drugs***" (Hepler et al., 1981: 33). These researchers considered that a cognitive framework would be most suitable for understanding doctors' prescribing behaviour because it allows the interplay of variables to be observed within subjects. In line with this reasoning, Hepler et al. (1981) concluded that doctors' prescribing

behaviour was an active, conscious problem solving process, based on an individual's beliefs and values which they derive from the clinical context. They argued that the problem- solving approach began with a description of a hypothetical patient followed by the therapeutic approach in which several drug choices are linked with their outcomes, and with the values doctors place on these outcomes. Based on Hepler et al.'s (1981) review, Segal and Hepler (1982) developed a cognitive model of doctors' prescribing behaviour. In this model, behaviour was the result of an active and conscious problem solving activity. Segal and Hepler (1982) extended Knapp and Oeltjen's (1972) theory of drug prescribing to include the opinions expressed by doctors' colleagues as an important influence on doctors' prescribing behaviour.

Segal and Hepler's (1982) approach was in line with Harrell and Bennett's (1974) and Lilja's (1976) perspectives on therapeutic outcomes derived from drug prescribing. These researchers argued that all the psychological studies described formally in the literature (Knapp and Oeltjen 1972; Harrel and Bennet 1974; Lilja 1976; Hepler, Clyne and Donta, 1982) related prescriber cognitions (eg. believes about drug effects) to actual or intended drug choices, with some models including prescriber attitudes. Segal and Hepler (1982) pointed out that according to the cognitive-based theories of behaviour, a person's cognitions (i.e., conscious knowledge,

and beliefs) are evoked by a stimulus and are enacted prior to the person's behaviour. Consequently, behaviour is the result of active, conscious problem solving, and a prescribing decision depends on the interaction of:

1) The prescriber's beliefs about the probabilities that certain outcomes would result from various treatment choices for a specific patient (i.e, ***instrumentalities***); and

2) The personal value of those outcomes to the prescriber (i.e., ***valences***).

Segal and Hepler (1982) also argued that two types of belief were considered in these theories:

- **Expectancy** - related to the person's set of subjective probability estimates that various levels of effort in "working up" a patient may result in a well-founded diagnosis or a well-developed treatment plan, which is important for initial success.
- **Instrumentality** - resulting from a subjective belief (such as well-developed treatment plan), and a consequent outcome, (such as patient cure or doctor's duty of good medical practice).

The researchers assumed that the ***instrumentalities*** (i.e., beliefs about drug effects and other outcomes of the therapy such as cost-effectiveness; low side-effects; etc) of each alternative treatment and ***valences*** (i.e., the

personal value attached to those outcomes by the prescriber) for each outcome could be obtained through the use of a questionnaire since prescribing behaviour was assumed to be a *problem-oriented process* with three different stages:

- Stage I - Analysis of data about the patient clinical context and consequent diagnosis;
- Stage II - Therapeutic plan; and
- Stage III - Patient outcomes.

Segal and Hepler's (1982) theoretical framework of doctors' prescribing behaviour encapsulated two cognitive models that explain and predict different stages of the clinical decision-process:

1) Data-Gathering Model; and

2) Drug-Choice Model.

According to the Data-Gathering Model (Segal and Hepler, 1982), clinical decisions at the Stage I are influenced by three main considerations:

- nonpsychological circumstances;
- the prescriber's clinical methods, particularly method of interviewing;
- the interaction of the doctor's expectations and valences.

Although the Data-Gathering Model was not investigated, the Drug-

Choice Model incorporated its influences, particularly the importance of the clinical context data. In the Drug-Choice Model, which addresses only stages II and III, the formulation of a "Therapeutic Plan" was found to be influenced by:

- The data about the patient coming from stage I (facts);
- The prescriber's valences for perceived outcomes that may occur in stage III; and
- The instrumentality of each alternative therapeutic plan.

Six main drug-treatment outcomes were identified by Segal and Hepler:

1) Control of disease state;

2) Patient compliance with a treatment;

3) Side effects of a treatment;

4) Treatment expense (cost) to a patient;

5) Satisfying a demand for a particular treatment by a patient; and

6) Criticism from colleagues.

After identifying and listing the common outcomes associated with drug therapy through interviews with twelve physicians, the authors used a questionnaire to test their drug-choice model. A questionnaire called the Prescribing Perceptions Instrument (PPI) was developed to obtain:

(1) The probabilities of use three different drugs for each of the six pre-selected outcomes;

(2) Doctor's personal value of each outcome (valences); and

(3) Instrumentalities.

The questionnaire was submitted to a sample of fifty resident or staff family practice physicians, who were given a hypothetical description of a hypertensive patient and three treatment choices, in order to collect the data. In a final open question, doctors were also asked to define what they assumed to be the correct drug treatment for the hypothetical hypertensive patient. Forty-six usable questionnaires were returned.

As the first step to test the power of the Drug-Choice Model (DCM) to predict a prescriber's attitude towards drug therapy, alternative treatments were defined. The analysis was based on the equation: $C_j=\sum V_k I_{jk}$, where

- C_j is the prescriber's valence of an alternative treatment j;
- V_k is the prescriber's valence of outcome k; and
- I_{jk} is the doctor's belief about the instrumentality of treatment j for outcome k.

The model's prediction of drug prescribing intention was based on the treatment alternative with the highest C_j score.

Control of the disease state was defined by the prescribers in this sample as being the most important outcome, followed by compliance with the therapeutic regimen, side effects, cost, demand, and criticism from colleagues. These findings confirmed earlier studies by, for example, Knapp and Oltjen (1972) and Lilja (1976), where ***instrumentalities*** and ***valences*** were found important predictors of drug choice. However, it must be noted that the relatively large standard deviations of outcome valence scores suggest that the generalisability of these findings is risky. As a result, inferences cannot be made about the importance of the validity of these outcomes in other medical practices. Furthermore, different doctors may assume other outcomes that were not identified.

In a later study Segal and Hepler (1985) tested the DCM under clinical conditions. Their goal was to obtain a theory of drug prescribing that would support and guide various prescribing intervention strategies. Two extensions of Segal and Hepler's (1982) findings were studied:

1) The doctor's prescribing intentions (or the doctor's prescribing behaviour) were a function of the highest calculated utility of all the alternative pharmaceutical products; and

2) The doctor's general beliefs about drug therapeutic effects with reference to typical hypertensive or diabetic diagnoses can be used to predict their prescribing behaviour and prescribing intention.

A questionnaire was designed to identify the doctor's guidelines for selecting first-line drug therapy for hypertension and diabetes mellitus. Forty doctors were given two fictional clinical case histories and six disguised case histories of patients they had recently treated for hypertension or diabetes mellitus in order to define:

- the beliefs about the probability that seven treatment-related outcomes would result from the prescribing of several alternative treatments; and
- the values placed on each outcome.

The doctors were also asked, in an open-ended question, how they would treat the patient described in the case.

For each patient visit, the researchers defined three different measures:

1. the actual prescribing (P_{sA});
2. the prescribing intention (P_{si}); and
3. the patient-specific beliefs connecting several prescribing alternatives and drug treatment outcomes (I_{sjk}).

Several utilities scores of treatment alternatives (C_j), one for each alternative treatment, were calculated according to the equation below:

$$C_j = \sum V_k I S_{jk},$$

where C_j is the prescriber's utility for treatment j, V_k is the subjective value of outcome k, and $I S_{jk}$ is the prescriber's belief about the

probability that prescribing treatment j would result in outcome k for a specific patient. Segal and Hepler's (1985) prediction of the doctor's actual prescribing behaviour, or the doctor's prescribing intention, was then classified as either correct or incorrect by comparing the highest calculated utility with Ps_A, or Ps_i.

To overcome the methodological problem of the questionnaire serving as a temporary decision structure for the respondents, Segal and Hepler's (1985) study data were collected from two sources:

1) Prescribers' interviews; and

2) Clinic records for patients of each participating prescriber.

This approach allowed researchers to "***compare the model's predictive power when prescribing intent was collected either at the same time as outcomes values and beliefs about treatment effects or one week later***" (Segal and Hepler 1985: 968). As pointed out earlier, doctors were asked to read a case description of a patient with either uncontrolled hypertension or diabetes mellitus. Each prescriber was then asked:

- to rate the patient's disease severity according to his or her impression of the untreated disease's effects on life expectancy and quality of life;
- to provide beliefs about the probability that certain drug treatment outcomes would result from several alternative treatments. Seven drug treatment outcomes were defined:

1. Control of the disease state,

2. The patient's ability to pay for a treatment;

3. Criticism from colleagues;

4. Satisfying a patient's wishes;

5. Unwanted reactions to a treatment;

6. Patient taking the medication properly; and

7. Having good data to back up my treatment choice.

- to assume the best therapeutic approach for the patient described, via an open-ended question.

Although the case description of a patient was presented as "hypothetical", it was derived from the original patient visit. This strategy allowed researchers to compare intended prescribing with the corresponding actual prescribing for that specific patient's description.

The social norm, based on the concept of avoiding criticism from colleagues, was found relatively unimportant in both studies (Segal and Hepler 1982; 1985), and doctors, as a group, did not assume price as a major consideration on drug choice (e.g., drug cost ranked fifth of seven in the last study).

Segal and Hepler's (1985) study found that prescribers highly valued patient and disease-related outcomes both of antihypertensive and antidiabetic therapies (controlling the disease; securing the patient's compliance, avoiding side effects). The substantial predictive value of the doctor's beliefs about treatment effects, which related these outcomes to specific therapeutic choices, confirmed that clinical outcomes were relevant to drug choice on hypertension and diabetes mellitus. These findings were compatible with earlier research using psychological models of doctors' prescribing behaviour (Knapp and Oeltjen, 1972; Harrell and Bennett, 1974; Lilja, 1976). Segal and Hepler (1985) have also suggested that knowing prescribers' cognitions of possible outcomes would allow the prediction of doctors' therapeutic approaches. These researchers also found that the choice of a specific drug, to obtain a particular drug outcome, was mainly related with the patient's clinical characteristics: "***Finally, this study shows that some prescribers, at least the young resident physicians in this study, see the usefulness of a particular drug for particular outcomes differently for different patients***" (Segal and Hepler, 1985: 975).

The drug choice model correctly predicted prescribing intentions in 81% of the hypertension cases and in 87% of the diabetes cases.

Actual prescribing was correctly predicted in 76% of the hypertension cases and in 70% of the diabetes cases (significant at p«0.01).

Segal and Hepler (1985) concluded that their cognitive model of drug prescribing was a useful model for predicting doctor's drug choice. However, the results should be carefully interpreted because they present some limitations, especially with respect to sampling. This study (like its predecessor) employed convenience sampling on a defined group of American doctors. As a result, Segal and Hepler's (1985) findings were derived from a sample that may or may not be typical of a larger group.

3.4.6 Epstein et al.'s (1984) Model

Epstein et al. (1984) also used the Fishbein and Ajzen (1975) model to study doctors' prescribing behaviour for anti-inflammatory medication. To investigate the relationship between doctors' beliefs, attitudes and their prescribing behaviour for anti-inflammatory drugs, 30 doctors in two Veterans Administration clinics were surveyed by questionnaire, and 1,265 of their prescriptions were collected.

Doctors' beliefs regarding three drug attributes: efficacy, side-effects and cost, and the relative importance of six drug attributes: efficacy, side-effects, likelihood of compliance, placebo effects, cost, and the patient's perception of doctors were measured.

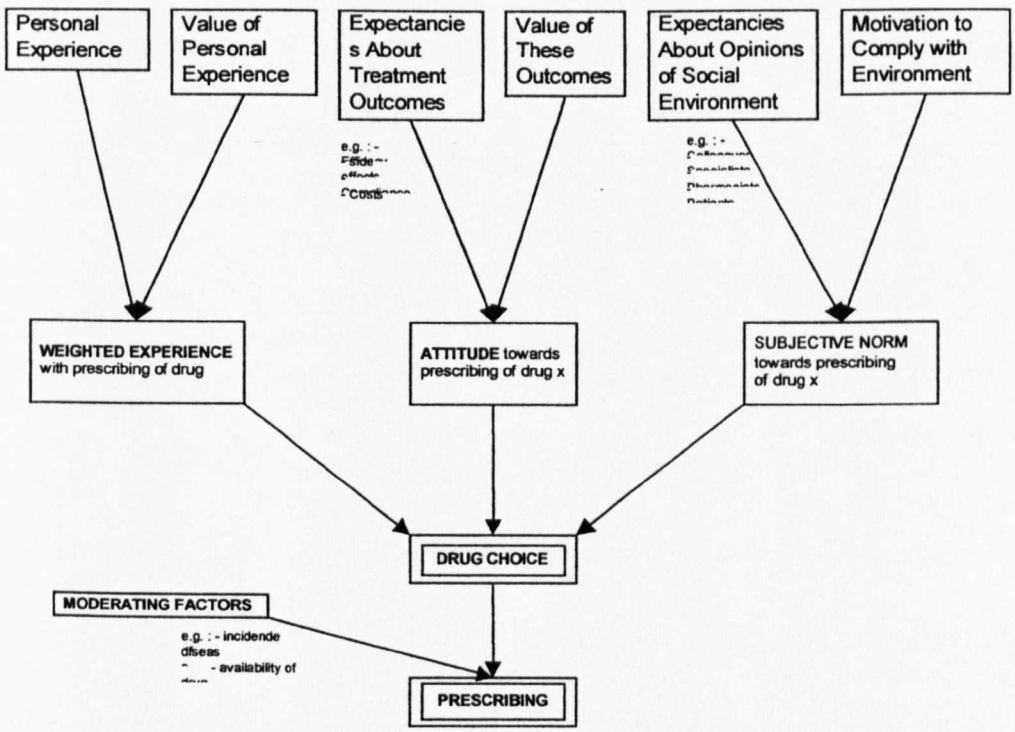
The doctors' beliefs were not found to be significantly related to prescribing behaviour. However, the researchers concluded that the results may be due to the small sample size (n=30) and the limited number of drug attributes and beliefs that were measured: "***First, our sample of physicians was relatively small. With a Type I error of 0.05, our sample of 30 doctors gave us a power of 83 percent to detect a real correlation of 0.4 was only 71 percent. Second, we did not control for case mix, either in collection of prescriptions or in our questionnaire. The correlations we found may therefore be spuriously low. Third, the beliefs we examined were limited to three elements; response rate, frequency of side-effects and cost. We did not obtain any information on beliefs relating to severity of side effects, likelihood of compliance, or other drug characteristics. It may be that some of these beliefs are related to drug prescribing in this particular situation. For these reasons, we are reluctant to conclude that beliefs are not related to prescribing behaviour for these agents***" (Epstein et al., 1984: 317). Nevertheless, the study found that doctors' evaluations of the importance of cost and placebo effects correlated significantly with prescribing behaviour ($p \ll 0.05$). However, Epstein and colleagues considered that changes in prescribing behaviour that related to changes in drug beliefs were easier to induce than changes in attitudes. Values or attitudes, on the other hand, were found to be dependent on more complex patterns of information including personal biases, habits and memorable experiences, as well as drug knowledge.

3.4.7 Denig et al.'s (1988) Model

Another interesting study of prescribing behaviour was conducted by Denig et al. (1988). Although Denig et al.'s (1988) theoretical framework used a derivative of the Fishbein and Ajzen (1975) Behavioural Intention Model, their model presents substantial differences from the one proposed by Segal and Hepler (1982; 1985).

Some researchers considered that the model represented in Figure 3.3 "*is more comprehensive than the one proposed by Segal and Hepler (1982)*" (Agrawal and Calantone, 1995: 100).

Figure 3.3: The Denig, Haaijer-Ruskamp and Zijsling's (1988) Model



The DHZ's model is based on three main components:

1) Expectations and values about treatment outcomes;

2) The role of professional opinions, of expectations and values about the professional acceptability of a particular drug therapeutic approach (i.e., subjective norm);

3) The doctor's personal clinical experience and value attached to it (i.e., prior behaviour).

The DHZ Model includes, in addition to expectancies and values about the treatment outcomes, two additional components:

- Personal experience and value of personal experience; and
- Expectancies about opinions of social environment and motivation to comply with environment.

Moderating factors such as the availability of the drug and the incidence of the disease were also present in DHZ model, which was pioneering in assuming that a doctor's personal clinical experience influenced their drug choice. That is, prescribing is determined in part by past clinical experience and the value attached to these experiences. Denig et al. (1988) argued that we view "reality" through the mediation of our system of concepts derived from prior behaviour. The interaction of "reality" and our concepts makes up "experience". Thus, prior behaviour determines experience, which in turn influences attitudes. However, attitudes were

also found to be important predictors of behaviour. As a result, the idea that behaviour exerts a reverse impact on attitudes, at least in certain situations, suggests that through personal experience, consumers learn which brands must be chosen to meet their needs and expectations. Therefore, Denig et al.'s (1988) research found that prior clinical experience with the drug was a major contributor to doctors' prescribing behaviour. In the DHZ model, direct links were established between:

a) prior behaviour and target behaviour;

b) prior behaviour and behavioural intentions; and

c) attitude and target behaviour.

In DHZ model, attitude directly affects behaviour by means of its influence on intention. As pointed out earlier, a second modification to Fishbein and Ajzen's (1975) theoretical framework was the addition of prior behaviour to the model: "***Previous behaviour is postulated to affect both current intentions and future behaviour, effects not predicted by the original Fishbein and Ajzen (1975) model*** (Fredericks and Dosset 1983: 502).

Denig et al. (1988), following Fredericks and Dosset's (1983) opinion, considered that the Bentler and Speckart (1979) were right when they considered that their approach was "***the most theoretically adequate causal-predictive system relevant to a variety of behaviour domains***" (Bentler and Speckart, 1979: 455). In line with this reasoning, Denig et al. (1988) and

Fredericks and Dosset (1983) assumed that Bentler and Speckart (1979) framework was better than Fishbein and Ajzen's (1975) model when explaining consumer behaviour:

In the TORA, "***formulation prior behaviour is not considered, hence intention has no competitor. Bentler and Speckart, on the other hand operationalize both prior and target behaviour via retrospective self-report***" (Fredericks and Dosset, 1983: 511).

Fredericks and Dosset compared the Fishbein and Ajzen (1975) model with Bentler-Speckart's (1979) modifications and concluded that their study supports Bentler-Speckart's hypothesis that direct paths from prior behaviour lead to both intention and target behaviour. However, a significant direct path from attitude to subsequent behaviour was not found. That is, information about prior behaviour and target behaviour increased the predictability of target behaviour but the inclusion of attitude variables did not. However, Denig et al.'s (1988) findings were neither in line with this assumption, nor with Fredericks and Dosset's view that: "***In essence, once prior behaviour is included in the model, the effects of intention become nonsignificant; that is, unnecessary for the prediction of target behaviour in these data***" (Fredericks and Dossett 1983: 511). In contrast, Denig et al. (1988), as well as Bentler and Speckart (1979), recognised that the effect of intention on subsequent behaviour was relevant.

The predictive power of the DHZ model and the role of its separate elements were tested in two regions in the Netherlands where 169 GPs, with an estimated practice size of more than 1250 patients, agreed to participate. Data were collected during interviews in which doctors were asked to estimate the components of the drug choice model for the treatment of two disorders:

1. irritable bowel syndrome (IBS); and
2. renal colic.

The authors pointed out that the former was "***a rather harmless disorder that is seen approx. 3 times every week by the physicians***"..., while the latter is "***an acute disorder that is seen once to twice a month by the physicians***" (Denig et al., 1988). For each disorder three commonly used drugs were selected from different ***therapeutic classes***. General practitioners were asked to give:

1. their expectations about the treatment outcomes of the three different drugs per disorder;
2. the value they attached to these treatment outcomes;
3. their expectations about both the professional acceptability of the drugs and patient demand for the drugs;
4. their motivation to comply with the professional environment and with the patients;
5. prior experience with the drugs; and
6. the value they attached to their personal experience.

Attitudes, personal clinical experiences, and subjective norms were found to explain 45% and 60% of the variation in the overall preferences for IBS and renal colic drugs, respectively. When the model was used to predict doctors' first drug choice, it was found that 73.6% and 78% of the first choices for IBS and renal colic, respectively, were correctly predicted by the model. However, further analysis of the model using Kappa as a measure of agreement between the model's prediction and drug choice, found that there was only a high agreement between the predicted and actual first drug choice for the treatment of renal colic. The Kappas indicated a low agreement in the case of the predicted and actual drug choice for IBS. Further, discriminant analysis using the three factors in the model (attitudes, subjective norms, and experience) was performed and found that discriminant functions were significant only for the drugs used in renal colic. The researchers argued that drug choice would be reliably predicted by their model if a rational prescribing behaviour was developed by the doctor, but the level of prediction would depend on the type of disease. Denig et al (1988), for example, suggested that the drug choice for IBS was less rational than drug choice for renal colic: "*The results suggest that in some fields of prescribing, physicians consciously weigh distinct pros and cons before choosing a drug, while in other fields the drug choice is less reasoned. In the latter case other - undiscerned - factors might be more relevant*" (ibid: 1385).

Although the influence of perceived patient demand on drug choice appeared to be negligible in Denig et al.'s (1988) study, the importance of the professional environment (colleagues, specialists and pharmacists) on doctors' therapeutic approach was relevant:

"*For choosing a drug for renal colic, the professional environment is even more important than the attitude towards the drug*" (ibid: 1386). The influence of the professional environment on drug choice was in line with Miller's (1973-74) findings. Denig and colleagues, therefore, suggested that educational programmes designed for groups would obtain better results than an individual approach. Identical results were obtained by Chinburapa and Larson (1987). These researchers, utilising Fishbein and Ajzen's (1975) Behaviour Intention Model as a conceptual framework, found that the subjective norm component was very important in explaining the doctor's prescribing intention. Although an opposing view was expressed in Segal and Hapler (1982; 1985) studies, Chinburapa and Larson (1987) pointed out that doctors' beliefs about treatment outcomes, as well as the subjective norm component (i.e., the social and professional factors), were relevant for understanding the doctor's prescribing behaviour. In a similar vein, Denig et al. (1988) pointed out that drug choice was a function of the interaction between expectations and values about treatment outcomes (i.e., attitudes), normative factors and personal experience.

The importance of the subjective norm was determined by asking doctors how far their colleagues would recommend a drug for a particular patient. This result was then multiplied by the doctor's general motivation to comply with those colleagues. The final score of the different treatment alternatives would be obtained through the formula:

$$\mathbf{T_x = \sum (A_i \times B_i) / a + \sum (C_j \times D_j) / b + E \times F},$$

where T_x is the "Treatment Score", "$\mathbf{(A_i \times B_i) / a}$" represents the attitude towards the drug X based on treatment outcomes **i**, while "$\mathbf{C_j \times D_j / b}$" is the subjective norm considering persons j, and finally **E x F** is the experience component of the model, which defines the weighted experience with the drug. "A" symbolises expectations about the treatment outcomes, while "C" is the medical professional acceptability of the drug therapeutic approach, and finally "E" represents doctors' personal experience with the drug. "B", "D", and "F" are the respective values for the corresponding variables.

As Denig et al. (1988) stressed, a reliable prediction of a prescriber's first drug choice using this theoretical framework depends on the type and severity of the pathology in question.

3.4.8 Denig and Haaijer-Ruskamp's (1992) Model

Denig and Haaijer-Ruskamp (1992) have handled the therapeutic decision making of doctors somewhat differently from previous researchers. These social scientists considered that general practice involves common clinical conditions in which most disease states are neither irreversible nor life-threatening. Consequently, most of the patient's health problems may be encapsulated within a few clinical categories with well established patterns of care that are rarely complex (Denig and Haaijer-Ruskamp, 1992). As a result, the therapeutic approach is usually a simple process with two different steps:

1. a small cluster of drugs come into the doctor's mind (i.e., the evoked set) when they have to treat a patient.
2. A specific therapy is chosen for the treatment of a specific disease.

Denig and Haaijer-Ruskamp (1992) suggested that the "evoked set" has just a few therapies, two to five possible drug alternatives depending upon the diagnosis. However, these researchers were unable to explain "***how the decision is made to include a therapy in the evoked set***" (Denig and Haaijer-Ruskamp, 1992: 12). As soon as a therapy belongs to a doctor's "evoked set", its prescription for an individual patient follows two different approaches:

- unreasoned process; or
- a rational and active problem solving.

1) **Unreasoned Process**

When choosing a specific therapy from a cluster of drugs, doctors may be influenced by their experience and consequent habits regarding the approach to disease states that frequently occurs in their clinical practice.

They may also use basic decision strategies to define the course of treatment. These heuristics, or rules-of-thumb, may be derived from active problem-solving or may have their origin in unreasoned processes:

"*To what extent the final decision to adopt a new treatment is determined by trial and error, simple persuasion, or by a reasoned weighing of pros and cons is unknown*" (Denig and Haaijer-Ruskamp, 1992: 12).

That is, the use of a drug from the "evoked set" is not always a reasoned choice and may follow a heuristic process (Denig and Haaijer-Ruskamp, 1992). Accordingly, with this assumption the researchers recognised the scarcity of studies about this specific point in the doctors' decision-making process.

2) **Active Problem Solving** (weighing pros and cons of the values and expected outcome for each possible option)

This approach is based on the evaluation of expected outcomes, after deciding which criteria are relevant to the decision. Outcomes are then ranked, or valued, according to their importance. As a result, a few potential therapeutic solutions will be chosen and one of them will be selected from the evoked set. However, "***if one wants to stimulate the use of a certain treatment that is not included in the evoked set, physicians have to be convinced that there is a need to change this evoked set. As long as the physicians believe that their evoked set is sufficient, publications about the medical and pharmaceutical properties of alternatives are not likely to change the drug choices. Acceptable reasons should be offered for changing the treatment options that are considered***" (Denig and Haaijer-Ruskamp, 1992: 13).

Doctors may choose different maximising strategies to decide the best treatment in accordance with an analytical procedure which involves:

a) a set of procedures that doctors engage in when attempting to choose between alternative prescribing courses of action; or

b) a decision rule that dictates how the results of the decision procedures will be used to make the actual prescribing decision (Denig and Haaijer-Ruskamp, 1992).

The set of procedures would be selected according to the patient's health

context and some important criterion and would guide the decision rule. A possible maximising strategy would be developed to choose the therapeutic approach that performs best on that criterion. If a 'tie' occurs, the second most important criterion would be chosen.

Doctors can also use the relevant criteria simultaneously. In this away, doctors would obtain the expected utility of each therapeutic approach, and would choose the treatment with the highest expected utility as the most suitable approach. Mathematically this highest expected utility can be described by the following equation:

$$\mathbf{EU}_j = \sum \mathbf{V}_i \,.\, \mathbf{O}_{ij},$$

where $\mathbf{EU}_j$ is the expected utility of treatment j, $\mathbf{V}_i$ is the value assigned to criterion i, and $\mathbf{O}_{ij}$ is the expected outcome of treatment j with regard to criterion i (Denig and Haaijer-Ruskamp, 1992).

To change doctors' unreasoned rules-of-thumb for prescribing, both facilitative and restrictive strategies should be used. The former suggests the use of guidelines, while the latter recommends the use of a formulary or of financial restrictions. However, Denig and Haaijer-Ruskamp (1992) proposed that before choosing an intervention strategy to improve doctors' rational prescribing behaviour, health authorities should look at the nature of the clinical problem in accordance with their model (see Figure 3.4).

Figure 3.4: The Denig and Haaijer-Ruskamp's (1992) Model

1. Doctor is presented with a clinical PROBLEM. As a result, an

2. EVOKED SET comes into the doctor's mind, which is influenced by:

a) ***DETAILING/ADVERTISING***

b) ***INFORMATION/EDUCATION TRIALS***

The evoked set is also influenced by:

a) knowledge about treatments
b) opinions of the environment
c) experience with treatment

which determine values and expectations.

The choice from the evoked set of a specific drug therapeutic approach for an individual patient can either be based on

3. UNREASONED RULES or 4. ACTIVE PROBLEM-SOLVING

Active problem-solving involves the weighing of expected outcomes for each possible option (i.e., ***reasoned rules***). Therefore, values as well as expectations influence this process. However, the choice of therapy may be adopted from an opinion leader without any reasoning by the doctor himself. In this case, ***unreasoned rules*** guide the intentional ***choice of therapy***.

5. CHOICE OF THERAPY

In some cases, this intention may differ from the actual prescribing due the influence of external (contextual) factors (i.e., ***limitations due to external factors***).

6. PRESCRIBING

3.4.9 Mancuso and Rose's (1987) Model

In the past decade, a substantial amount of research into decision-making has focused attention on understanding the cognitive processes underlying judgement and choice, and on the clinical context (Chinburapa et al., 1993; Chinburapa and Larson, 1992; Chinburapa and Larson, 1988; Mancuso and Rose, 1987). However, these cognitive processes were found to differ from the traditional compositional approach to attitude measurement such as the TORA model. The expectancy-value framework, as hypothetic-deductive analysis, has been used as the model that researchers proposed in diagnostic decisions for clinical problem solving by the description of a *hypothetical patient.* By structuring the patient observation, the clinical situation can be disaggregated in sub-problems, which assume the form of a decision tree. With this approach, the clinical events, the likelihood of their occurrence, and the importance of the outcomes attached to different drug choices (i.e., utilities), can be linked and the best therapeutic solution found. However, Mancuso and Rose (1987) argued that doctors were not seen to generate hypothesis regarding optimal treatment, nor did they search the case for further data to support treatment choices or solve clinical problems by growing a decision tree in their heads.

Focal composite analysis (Mancuso and Rose, 1987) (which is similar to cognitive models based on expectancy-value theory and its consequent

therapeutic decision-making process), determines the relevant clinical facts selected during patient observation and evaluates them to define the best therapeutic approach. This change in the focus of research was because of the complexity of the clinical context. Some researchers argued that doctors' cognitive processes when making therapeutic decisions in a complex clinical situation in which more than one drug treatment is acceptable, were different from those that GPs face in primary care (Mancuso and Rose, 1987). For example, the disaggregation of a patient's clinical context (such as coronary heart disease) into sub-pathologic realities so as to obtain a simplification of the problem, can be a complex and time consuming process (Mancuso and Rose, 1987). Thus, the doctor's clinical reasoning was understood as a decision making process based on relevant clinical facts selected through patient observation. This was termed ***focal composite analysis***.

In Mancuso and Rose's study, eighteen internists were presented with three *hypothetical cases of patients* with coronary heart disease and were asked to explain their therapeutic approach. A technique of process tracing was used to characterise the doctors' therapeutic decision making.

These researchers developed their cognitive model of therapeutic decision making, **the focal-composite model**, with a hypothesis-generating study in which the problem-solving strategy is done through narration at each

step in the decision making process. They concluded that doctors arrived at therapeutic decisions by selecting and evaluating focal points, one element at a time, in order to reduce the amount of information that accompanies a case history. The first step in the process looked for the most important facts, a few focal points, which were evaluated with respect to treatment options. Then, the value of each focal point was evaluated as a function of other focal points and the patient's clinical story. The final step was characterised by the assessment of the total sum of focal points in order to decide the best therapeutic decision for the patient. The analysis of each focal point was done with a knowledge of the relevant literature on the field and with physicians' clinical experience of similar cases, in order to identify the most important factors that would ultimately influence the treatment decision. These arguments suggested that one way doctors simplify complex problem-solving by focusing on attributes that are particularly informative and predictive in terms of the patient therapeutic approach. Other researchers also considered that "*The cognitive method for clinical decision making under uncertainty appears to be incremental, subdividing the overall decision into sub-problems solved on the basis of a few attributes*" (Moskowitz et al., 1988: 443). Mancuso and Rose pointed out that the attributes that were considered central to a pathology's correlational structure, and for this reason correlate with many other

attributes, were more diagnostic than less central attributes. The values attached to each central attribute would determine the power to predict the best prescribing solution and would be assumed as focal points. Rather than searching for a universal and exhaustive taxonomy of factors that are important to a therapeutic solution, focal composite analysis requires to isolate only those focal points that doctors use when simplifying a complex clinical problem. These focal points were chosen following a heuristic process that simplifies the way doctors deal with clinical information in order to select a limited set of drugs options: "*Physicians, guided by their own sets of heuristics, chose factors they considered most important. For example, a frequently used heuristic was to recognize having managed similar cases in the past*" (ibidem: 1284). This approach offers a better short cut to a therapeutic decision: "*By contrasting actual decision making with decision analysis, physicians would be able to make better and better justified therapeutic decisions*" (ibid: 1284). However, doctors' personal ***clinical values*** were found to have an important role in drug choice:

"*Because therapeutic choices must often be made without a "state-of-the-art" standard, physicians implicitly or explicitly incorporate their own personal values in the formulation*" (ibidem: 1284).

Mancuso and Rose suggested that further research was needed to clarify the importance of these personal ***clinical values***.

3.4.10 Chinburapa and Larson's (1992) Model

Chinburapa et al. (1987), utilising the Fishbein and Ajzen (1975) behaviour intention model as a conceptual framework, found that the subjective norm component (i.e., the social factor) was significant in explaining doctors' prescribing intentions. In the following study, however, the role of peers was found to be relatively unimportant (Chinburapa and Larson, 1988). In contrast with the initial study, Chinburapa and Larson's subsequent (1988) study used conjoint analysis[4] for predicting prescribing intention and assessing drug attribute importance for a *hypothetical case of a patient* with essential hypertension. This method, in contrast with the expectancy-value theory, analyses the trade-offs that doctors have to make when judging between multi-attribute alternatives. Nevertheless, the relative importance of drug attributes obtained from both methods was not significantly different. Effectiveness and side-effects were considered the most important attributes. Dosage schedule was found to be the third most important attribute. Based on these findings, Chinburapa and Larson (1992) developed a multi-attribute model which was considered relevant both for the pharmaceutical industry and health authorities:

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[44] Conjoint analysis is a measurement technique "*from the fields of mathematical psychology and psychometrics that can aid the marketing manager in sorting out the relative importance of a product's multidimensional attributes*" (Green and Wind, 1975: 108).

"*From a pharmaceutical marketing perspective, information about a physician's perception of a product is useful to identify particular characteristics that can affect the drug's position in the market place...From a health care administrator's perspective, the information can be used to help design educational programmes to influence drug prescribing*" (Chinburapa and Larson, 1992: 334).

Their model represents the outcome of considerable reflection on doctors' prescribing behaviour.

The purpose of Chinburapa and Larson's study was to assess the relative importance to doctors of specific side effects and outcomes (i.e, the control of disease, convenient dosing and cost) as they differentiate drug products for hypertension, allergic rhinits, and gastroesophageal reflux. In addition, the study examined whether the importance of particular characteristics attributed to a drug varied across four types of practice:

- solo practice;
- group practice;
- institution; and
- government.

Chinburapa and Larson reported a response rate of 22% (i.e., 527 responses from 2,400 surveys mailed).

The effective control of disease was perceived to be the most important outcome, followed by the avoidance of specific side effects, in all three prescribing scenarios. This result is consistent with earlier prescribing research (Chinburapa and Larson, 1988; Denig et al., 1988; Zelnio, 1982; Lilja, 1976). The practice setting was neither important in terms of its influence on beliefs, nor in terms of its influence on results in any of the three prescribing scenarios. However, doctors in each setting were found to have different intentions towards prescribing certain studied drugs: "*For hypertension the likelihood of prescribing the four drugs was higher among solo and government physicians than institution-based and group practice physicians. Furthermore, government physicians were more likely to prescribe different antihistamine drugs than solo or group practitioners. In the gastroesophageal reflux case, solo practitioners were more likely to prescribe different drugs than were institution-based or government physicians*". (Chinburapa and Larson, 1992: 340).

Based on their findings, the researchers concluded that professional peer pressure had a strong influence on doctors' prescribing intentions. This finding was in line with Chinburapa et al.'s (1987) study, in which the subjective norm component, as suggested by Fishbein and Ajzen (1975), was measured by asking the respondent to indicate the likelihood that his colleagues would recommend a drug for a particular patient and multiplying by the doctor's general motivation to comply with colleagues.

3.4.11 Chinburapa et al.'s (1993) Model

Substantial evidence has been found in the prescribing literature that supports the importance of two different factors in the drug decision-making process (Chinburapa et al., 1993; Denig and Haaijer-Ruskamp, 1992):

a) **Situational involvement**; and

b) **Task complexity**.

Situational involvement was defined as "***the ability of a situation to elicit from individuals concern for their behavior in that situation***" (Houston and Rothschild, 1978: 184). The construct of 'involvement' has received intensive and rapidly growing attention in consumer behaviour research during the last decade (Broderick et al., 1995). In terms of prescribing behaviour, published empirical evidence suggests that a high involvement subject requires a more careful decision-making process based on a clear, systematic and analytic approach to the clinical situation. In contrast, a low involvement subject is less demanding in terms of the structure of the analytic framework in the decision-making process (Chinburapa et al., 1993; Denig and Haaijer-Ruskamp, 1992).

Task complexity was defined as the amount of information processing that subjects have to deal with to manage the task.

Three different factors were reported to characterise **task complexity**:

- the number of alternatives in the evoked set;
- the number of attributes; and
- time constraints.

To reduce the information-processing demands and cognitive effort derived from **task complexity**, consumers develop heuristic processes. When individuals have to face tasks with several alternatives they use a noncompensatory decision-making approach. However, if there are only a few alternatives, the process is simpler and individuals assume a compensatory decision-making process (Chinburapa et al. 1993).

Conjoint analysis was used by Chinburapa and colleagues to determine the predictive accuracy of the linear compensatory model in predicting doctors' drug choice. The interaction effect between the characteristics of the decision task (i.e., *task complexity*) and the decision environment (i.e., *the importance of making a correct decision and the need to justify the decision to others*) was also analysed. In addition, they attempted to understand the factors that affect the use of various decision-making processes.

Noncompensatory processes, such as **conjunctive** and **elimination by aspect** (see Figure 3.5 for details), which do not involve tradeoffs between attribute values and which only consider a subset of available information when making the decision, were chosen to analyse drug choice.

Figure 3.5 : Compensatory and Noncompensatory Processes

- **Compensatory Processes**

Multiattribute model: **A perceived weakness or negative evaluation on one criterion is compensated for by a positive evaluation on another criterion. Separate evaluations for each choice alternative are combined (added or averaged) to form the overall evaluation of each one. Then the highest-rated alternative is chosen.**

- **Noncompensatory Processes**

Conjunctive: **The consumer establishes a minimum acceptable level for each choice criterion. The consumer accepts an alternative only if every criterion equals or exceeds the minimum cut-off level.**

Disjunctive: **The consumer establishes acceptable standards for each criterion. A product is acceptable if it exceeds the minimum level for at least one criterion.**

Lexicographic: **The consumer ranks choice criteria from most to least important. S/he chooses the best alternative according to the most important criterion. If a tie occurs, s/he selects the best alternative according to the second most important criterion, and so on.**

Elimination by aspects: **The consumer establishes minimum cut-offs for each choice criterion. S/he selects one criterion and eliminates all alternatives that do not exceed the cut-off level. S/he continues eliminating alternatives until just one alternative remains which s/he then chooses.**

Combination Process: A mix of compensatory and noncompensatory processes, combined or "constructed" on the spot to adapt the environmental factors.

Source: *Adapted from James R. Bettman* (1979), An Information Theory of Consumer Choice, *Reading, Mass: Addison-Wesley.*

The *decision-making strategies* described above also differ in terms of the cognitive effort required to use the strategies and in terms of their ability to lead to the optimal decision (Chinburapa et al., 1993). Compensatory decision-making processes were considered to be more complex, to require greater cognitive effort, and to be more difficult to apply than noncompensatory processes. However, compensatory processes were considered to be more likely to lead to the optimal decision than noncompensatory processes which only examine a subset of available information and are more likely to lead to inconsistency or intransitivity in preferences.

A sample of forty-eight doctors were asked to indicate their preferences and choices for hypothetical anti-infective drugs. Chinburapa et al. (1993) used a combination of a process-tracing and an analysis of final judgement techniques to examine the effects of situational involvement and task complexity on the doctors' decision-making process. The *process-tracing technique* employed in their research was the *analysis of information acquisition behaviour*. The importance of the decision and the level of responsibility related with the decision were found to be directly responsible for the selection of more analytic strategies of information acquisition: i.e., more effort to process the information and more time to make the decision. The total amount paid for making a correct decision

would therefore increase. However, these researchers postulated that "***the decision strategy used in a given situation is a result of balancing the cost and benefits***" (Chinburapa et al., 1993: 1474). In accordance with this reasoning, the choice of any decision strategy was assumed to be closely related with the characteristics of the decision problems, decision and task environments, and with the characteristics of the decision maker. Given this assumption it would be possible to extrapolate that situational involvement would have a significant effect upon, and interaction with, task complexity during the information acquisition and decision-making processes: "***the effect of task complexity on decision-making process depends on the subject's level of situational involvement***" (Chinburapa et al., 1993: 1474). For this reason high-involvement subjects were supposed to use a more analytical decision-making process (i.e., compensatory processes) than low-involvement subjects. However, Chinburapa et al's (1993) study *did not prove the existence of a significant effect of situational involvement on the use of decision-making processes.* The increase in task complexity was found to have a major and direct influence on the amount of cognitive strain and information overload, which in turn was responsible for the use of fewer analytical strategies to simplify the decision task and reduce the cognitive effort. Task complexity was found to have a strong effect on information acquisition and decision-making processes. However, these

processes were contingent upon the characteristics of decision tasks and other factors, which support their contingency model based on the cost/benefit framework. That is, the results of the study clearly indicated that doctors shifted from using compensatory to noncompensatory decision-making processes when task complexity increased. The results also indicated that the relative importance of drug attributes varied under differing levels of task complexity. Task complexity was therefore found to be important for the clarification of specific drug attribute information. This finding was assumed to be relevant for understanding and influencing doctors' prescribing behaviour (Chinburapa et al., 1993). The most relevant findings, however, were not only the use of noncompensatory processes in decision-making, but also that there were no trade-off attribute values in certain clinical conditions: "*The findings that physiscians used noncompensatory processes and did not trade-off attribute values in certain conditions indicated that only a few alternatives may be considered in decision-making*" (ibid: 1481). These findings are in line with Denig and Haaijer-Ruskamp's (1992) study on the limited set of doctors' treatment options (i.e., the evoked set), which were found to vary between two to five depending upon the diagnosis. In line with this reasoning, Chinburapa et al. (1993) suggested that it was important to accurately identify the few attributes and alternatives as well as pre-existing beliefs about the

attributes for drug alternatives in the evoked set. Such information was considered critical to clinical decision-making processes and should therefore be used to effectively design communication messages to influence doctors' prescribing behaviour. Finally, Chinburapa and colleagues considered it relevant to use a **multi-method approach** to study doctors' decision-making processes:

"*The use of a combination of methods enables researchers to gain insights into how decision-making processes and choices are affected by decision contexts*" (ibid: 1481).

Chinburapa et al.'s (1993) study confirmed that *there was no single, context-free clinical decision-making process*. Thus, *expectancy-value theory was not the best framework for predicting drug choice*. These researchers criticised the foundations of the expectancy-value framework in terms of its:

- linear, compensatory decision-making processes in which all relevant drug attributes or outcomes are considered;
- tradeoffs among attribute values; and
- proposition that overall evaluation is formed independently on each alternative and the alternative with the highest overall evaluation is chosen.

3.4.12 Lambert et al.'s (1997) Extension to the TORA

As pointed out earlier, the TORA (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975) has, over the years, been applied to doctors' prescribing behaviour (Segal and Hepler, 1985; 1982; Epstein et al., 1984). However, recent research on a proportion of prescriptions written by 19 primary care physicians over a three month period found that antibiotic prescribing was not significantly related to doctors' general attitudes, subjective norms, or stated prescribing intentions. Using Ajzen and Fishbein (1980) and Fishbein and Ajzen's (1975) theoretical framework, Lambert et al. (1997) found that "***attitudes, subjective norms, and prescribing intentions were related to one another in predictable ways, but actual prescribing of the seven selected antibiotics was not related to any of these psychological constructs***" (Lambert et al., 1997: 1774). Surprised by these unexpected results, the researchers argued that "***antibiotic prescribing at the facility studied was, in some sense, not under physicians' volitional control***" (Lambert et al., 1997: 1775). Three main factors were advanced to justify this conclusion:

1. Treatment protocols;

2. Formularies; and

3. The corporate transformation of medicine and the rise of managed care in recent years.

Given these changes to doctors' prescribing autonomy, Lambert et al. (1997) argued that *the TORA was no longer the best theoretical framework for modelling prescribing behaviour* because it was unable to capture the importance of non-volitional or partially volitional drug choice. Therefore, a revised version of the TORA, known as the theory of planned behaviour (Ajzen, 1985; Ajzen and Madden, 1986) was assumed a better approach to modelling the non-volitional or partially volitional aspects of doctors' therapeutic approach (Lambert et al., 1997). However, to understand Lambert et al.'s (1997) critic of the use of the TORA on doctors' prescribing behaviour, it is necessary to analyse the changes that can be identified in the evolution of this theoretical framework. The contribution of other prestigious researchers to this discussion is also relevant (Bagozzi, 1992; 1982; Ajzen and Madden, 1986). Given its simplicity and applicability to different consumer contexts, it is not surprising that the TORA has been considered a fundamental model for explaining social action: "*As shown by its longevity, the theory of reasoned action has considerable theoretical and practical appeal. From a theoretical point of view, it is intuitive, insightful in its ability to explain behaviour, and parsimonious. From a practical perspective, it has been applied successfully to contexts such as consumer, health, voting, recreational, and organizational behaviors...It is easy to operationalize and yields relevant policy implications in everyday settings*" (Bagozzi, 1992: 180).

In spite of the importance and success achieved by the TORA, some researchers have been arguing that some fundamental problems, related primarily to the theory's boundary conditions, remained unresolved (Bagozzi, 1992; 1982; Ajzen and Madden, 1986). Different studies that have been dealing with attitude research on drug choice stressed the importance of these conditions in the methodological transition from verbal responses to actual behaviour (Segal and Hepler, 1982; 1985; Harrell and Bennett, 1974). Segal and Hepler for example, used patient-specific measures of both prescribing intention and prescribing behaviour in order to obtain a strong correlation between these two components of the TORA. Segal and Hepler (1985) pointed out that the use of a general measure of intention to predict a specific measure of behaviour would result in a weak relationship between the two constructs. Furthermore, the application of the TORA to doctors' prescribing decision-making has also been questioned because of the elapsed time between the intention to act and the behaviour itself:

"*Of course, the time lags between BI and B measures may alter considerably the situation for each measurement*" (Harrel and Bennet, 1974: 270).

In line with the reasoning that has been advanced, three main prerequisites are necessary to obtain a strong correlation between intention and behaviour (Ajzen and Madden, 1986):

1. the measure of intention must correspond in its level of generality to the behavioural criterion;

2. intention must not have changed in the interval between the time at which it was assessed and the time at which the behaviour is observed;

3. the behaviour under consideration is assumed to be under volitional control.

According to the third criterion, the TORA applies only to actions that are under volitional control:

"***People can easily perform these behaviors if they are inclined to do so***" (Ajzen, 1985: 12).

A behaviour may be considered to be completely under a person's control "*if the person can decide at will to perform it or not to perform it*" (Ajzen and Madden, 1986: 455).

This key assumption was considered absent from the new U.S.A. prescribing context (Schlegelmich et al., 1990), which is characterised by increased surveillance of doctors' clinical freedom in terms of drug choice: "*formulary management and concurrent drug utilization review are now followed up by computerized prescribing profiles and recommended intervention protocols to control costs, improve quality, and constrain what management considers to be erratic physician behavior*" (Lambert et al., 1997: 1775-76).

A similar conclusion was obtained by Agrawal and Calantone (1995) two years before:

"*New drug adoption models also need to incorporate the effects of new gatekeepers - the hospital administrators and the insurance companies - on a physician's decision making process regarding a new drug*" (Agrawal and Calantone, 1995: 108).

In line with the reasoning that has been advanced, Lambert et al. (1997) argued that the erosion of doctors' clinical freedom that has accompanied the rise of corporatisation and managed care requires a non-volitional or partially volitional approach to prescribing behaviour.

The total control of any situation (i.e., volitional control) is only present in a limited range of behaviours (Bagozzi, 1992; Ajzen and Madden, 1986). Thus, strictly speaking, most intended behaviours are best considered ***goals***, whose attainment is subject to some degree of uncertainty (Ajzen, 1985). In line with this reasoning, one must face this problem in terms of behaviour-goal units. As a result, intentions must be faced as plans of actions towards behavioural goals (Ajzen, 1985). The degree of uncertainty of these plans of action towards behavioural goals reinforces the importance of the concept of perceived behavioural control, which is defined as "*the person's belief as to how easy or difficult performance of the behaviour is likely to be*" (Ajzen and Madden, 1986: 457).

To explain behaviours not "completely" under volitional control, Ajzen and Madden (1986) introduced the theory of planned behaviour (TOPB).

The TOPB is identical to the TORA except that a new antecedent to intentions and behaviour - perceived behavioural control - has been introduced. Therefore, the behaviour under explanation refers not to actions totally under volitional governance as with the TORA. In this case, the TOPB embraces actions subject to interference by internal and external forces (Ajzen and Madden, 1986). Bagozzi and Edwards (1998) examined the interaction between *weight loss intentions* and *perceived behavioural control* over body weight, and argued that various personality factors may moderate the effect of perceived behavioural control on behaviour. Therefore, "*To ensure accurate prediction of behaviour over which individuals have only limited control, we must assess not only intention but also obtain some estimate of the extent to which the individual is capable of exercising control over the behaviour in question*" (Ajzen and Madden, 1986: 456). In line with this reasoning, a measure of *perceived behavioural control*, which represents "*the person's belief as to how easy or difficult performance of the behaviour is likely to be*" (Ajzen and Madden, 1986: 457) was developed.

According to the TOPB, the presence or absence of requisite resources and opportunities were among the beliefs that ultimately determine the conative posture. That is, the more that attainment of a behavioural goal is

faced as being under volitional control, the stronger is the individual's intention to develop the behaviour. As in the case of behavioural and normative beliefs, it is possible to identify and measure these perceived behavioural control beliefs, and treat them as partly independent determinants of behaviour:

"Just as beliefs concerning consequences of the behaviour are viewed as determining attitudes, and normative beliefs are viewed as determining subjective norms, so beliefs about resources and opportunities may be viewed as underlying perceived behavioural control" (Ajzen and Madden, 1986: 457).

These researchers concluded that like attitudes and subjective norms, perceived behavioural control was related to an underlying set of salient beliefs which provide useful information about the opportunities and resources to perform the partially volitional behaviour. Thus, perceived behavioural control was found to be an important predictor beyond attitude, subjective norm, and intentions, which were the constructs presented in the original TORA (see Figure 3.6 and Figure 3.7).

Fig. 3.6: Theory of Reasoned Action

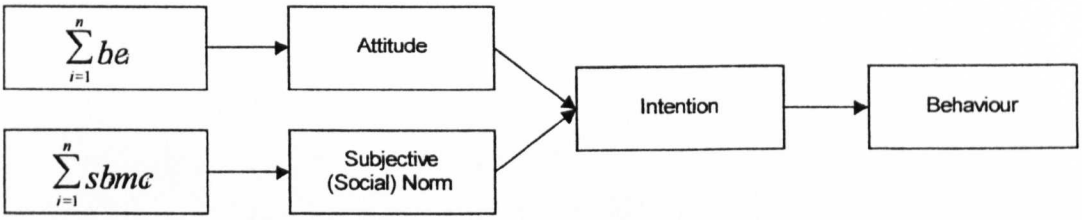
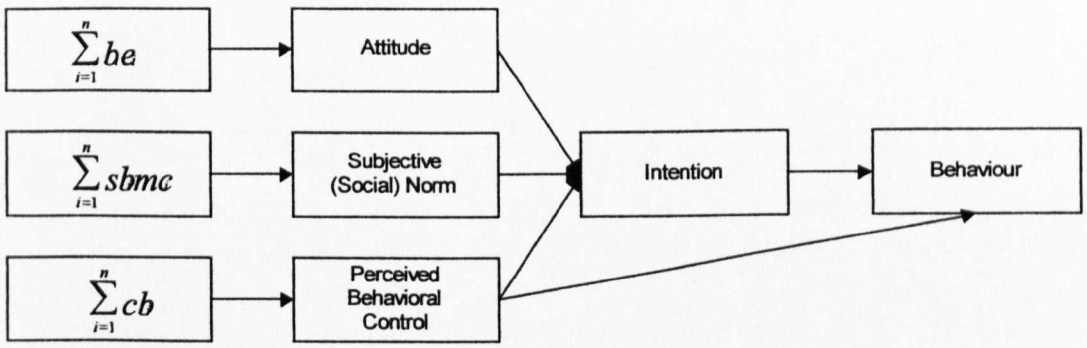


Fig. 3.7: Theory of Planned Behaviour



Where :

$b =$ behavioural beliefs (likelihood)

$e =$ Evaluation (desirability)

$sb =$ social referent belief (approval)

$mc =$ Motivation to comply (Concern)

$cb =$ control beliefs (do not need resources)

Ajzen and Madden (1986) schematically presented two possible models of the theory of planned behaviour.

The first version was based on the assumption that perceived behavioural control had motivational implications for intentions. This direct causal effect of perceived behavioural control on intention was the main divergence from the TORA. Individuals who believe that "*they have neither the resources nor the opportunities to perform a certain behavior are unlikely to form strong behavioral intentions to engage in it even if they hold favourable attitudes toward the behaviour and believe that important others would approve of their performing the behaviour*" (Ajzen and Madden, 1986: 458). Thus, an association between perceived behavioural control and intention should be considered independent from attitude and the subjective norm in the sense that was not mediated by either the former or the latter. Perceived behavioural control was therefore found to correlate with attitude and subjective norm, and was found to exert an independent effect on behavioural intention (Ajzen and Madden, 1986). However, Ajzen and Madden pointed out that it was not possible to assume an additive effect which nature determines by itself as an intention to perform a behaviour. According to this perspective, behavioural control was considered a necessary, but insufficient, condition for the final behaviour. Such reasoning, developed in the first version of the TOPB (Ajzen and Madden, 1986), reinforced the argument that perceived behavioural control affects intention in interaction with attitude and a subjective norm.

In contrast, the ***second version*** assumed the possibility of a direct link between perceived behavioural control and behaviour that was not mediated by intention (see Figure 3.7). However, the idea presented in the second version of the model (Ajzen and Madden, 1986) was sufficiently flexible to embrace the fact that attainment of behavioural goals was dependent not only on intention but also on behavioural control.

According to this second version of the theory, behaviour could be affected both by the direct and indirect influence of perceived behavioural control. The former would influence behaviour by its capacity to become a partial substitute for a measure of actual control, while the latter would do so via intentions. Nevertheless, the direct connection between behavioural control and behaviour is assumed to represent a nonvolitional determination of action (Bagozzi, 1992).

Ajzen and Madden (1986) argued that two critical conditions should be observed to validate the theory of planned behaviour:

1. the behaviour being predicted must not be under volitional control, otherwise the concept of perceived behavioural control becomes largely irrelevant to the prediction of behaviour and the theory of planned behaviour reduces to the theory of reasoned action.

2. it must be evaluated the level where perceptions of behavioural control represent actual control in the situation, in order to be accurate. The measure of perceived behavioural control was found to be relevant only in situations where both perceptions of behavioural control and actual control are almost identical. Furthermore, the interaction effect, which was considered to be the result of a close relationship between intention and control towards the performance of a behaviour, should also be present when we assume that the effect of intention on behaviour depends on perceived behavioural control.

In accordance with these two critical conditions that support the use of the TOPB, it is clear that this model represents an extension of the TORA: "*In sum, the theory of planned behaviour complements the theory of reasoned action. The latter applies only to behaviors totally under volitional control; the former addresses behaviors under partial volitional control. Perceived behavioral control is thought to take into account personal deficiencies or external obstacles that possibly might thwart performance of an act*" (Bagozzi, 1992: 181).

In their study of class attendance by college students, Ajzen and Madden (1986) found the addition of perceived behavioural control to the classic TORA greatly improved their model's predictive power: "*Perceived behavioral control had a strong effect on intentions to attend class, and effect not mediated by attitude and subjective norm, and not dependent on the influence of past behaviour*" (ibid: 465).

In accordance with later studies, Ajzen (1991) reinforced the conviction that the TOPB was clearly preferable to the TORA.

Based on the results derived from a study of employees' attendance at a training session, Fishbein and Stasson (1990) questioned the assumption that the TOPB permitted more accurate prediction of intentions and goal attainment than did the TORA.

Madden et al. (1992), however, found that TOPB had better accurate prediction of intentions and goal attainment than did the TORA.

In line with Madden et al. (1992), Ajzen (1991) and Ajzen and Madden's (1986) convictions about the predictive power of their model, Lambert et al. (1997) proposed that the TOPB be used in a study of drug choice within managed care settings:

"*The widespread implementation of managed health care marks an historical point of inflection after which it appears that the utilization of drugs will be dominated more by management systems than by individual physician decision-makers. Models that acknowledge this new reality may perform better than existing individualistic, psychological models at predicting and explaining the utilization of antibiotics as well as other classes of drugs*" (Lambert et al., 1997: 1777).

Unfortunately, however, no empirical work was presented to evaluate the interest of the TOPB on managed care settings.

3.5 Evaluation and Comparison of the Most Representative Models

3.5.1 Definition of the Criteria to Evaluate the Models

Usually, consumer behaviour models represent a simplified description of the complex decision-making process of consumers (Howard, 1989; Chisnall, 1985; Zaltman and Wallendorf, 1983; Zaltman et al., 1973). With these simplified frameworks (usually presented diagramatically), the marketer can be much more effective in predicting how consumers might respond to his/her marketing effort. Thus, "*models of buying behaviour have two basic uses for marketing managers:*

1. *They describe in simplified form the market parameters or characteristics affecting the purchase of certain types of goods or services.*
2. *They allow predictions to be made of the likely outcomes of specific marketing strategies*" (Chisnall, 1985: 160).

The criteria from which the models are evaluated may vary according to the researchers' goals: "*A model can be evaluated on different criteria, depending on who is doing the evaluation and what purposes and functions that person believes the model should perform. For instance, the mathematician looks for quantitativeness and precision. A social scientist evaluates a model on the basis of its insight into human behaviour and its explanatory power. A practitioner, such as a marketing manager or a public policy maker, looks for a model's applicability or utility in decision making*" (Zaltman and Wallendorf, 1983: 622).

For pharmaceutical marketing managers, the model's applicability depends on its capacity to represent the needs or values that guide doctors' prescribing decision-making (Corstjens, 1991). That is, the model has to be "*useful in specifying possible relationships between variables and in suggesting a hypothesis which may be empirically tested*" (Foxall and Goldsmith, 1994: 25). If the relationships between variables were shown to be correct, with exact sequences between them, and if cause and effect relationships were well formulated, both the model's explanatory and predictive power will increase (Agrawal and Calantone, 1995; Lilien et al., 1981). Four main characteristics have been identified in models with high predictive power. Such models are able to (Lilien et al., 1992):

1) identify and measure all major variables making up a behavioural system;

2) specify fundamental relationships between the variables;

3) specify exact sequences and cause and effect relationships; and

4) permit sensitivity analysis in order to explore the impact of changes in the major variables.

This framework, supplemented by criteria derived from existing work on the philosophy and methodology of science such as the criteria proposed by Zaltman and Wallendorf (1983) (see box 3.2 below), will be used to evaluate the most representative models on doctors' prescribing behaviour.

According to Zaltman and Wallendorf (1983) a model must have 10 desirable properties, which serve as a useful checklist for model building and development. The properties are as follows:

Box 3.2 : Zaltman and Wallendorf's (1983) Criteria

1. capable of explanation as well as prediction	*2. general*	*3. high in heuristic power*	*4. high in unifying power*	*5. internally consistent*
6. original	*7. plausible*	*8. simple*	*9. supported by facts*	*10. testable, verifiable*

The explanatory and predictive capacity of a model is fundamental. The capacity for explanation must guide the development of the model since it allows good predictive power. In addition, in order to be used in several different buying situations a model should be sufficiently general. The heuristic power of the model will be important if new questions for future research are to be posed, while its unifying power is determined by its capacity to bring together previously unrelated areas of knowledge. Thus, a good consumer behaviour model must be based on a "***specific theory of how people process the information that is provided in the behavioural cues and how these motivate action***" (Bagozzi and Dabholkar, 1994: 317).

To properly explain consumer behaviour, the model has to be free of logical incongruities that diminish its internal consistency.

The originality of a model is the researcher's contribution to science, and to the state of the art. As science is a state of permanent evolution, the plausibility of a model does not mean that it is conclusive in its representation, but that the model should at least ensure its capacity to make sense in terms of validity.

The model should introduce the complexity that it wants to explain in a way that is understandable and useful for academic or professional purposes, and for this reason it should be *as simple as possible.* Any complexity that becomes irrelevant to explanations of the phenomena under study must be avoided.

The facts presented in the situation under study must be encapsulated by the model, and they should be obvious at the time of its development. Although existing facts should not be denied, this does not mean that the model is unable to refuse a particular explanation related to the facts.

Finally, the assumptions presented in the development of the model must be testable and verifiable in order to evaluate the level of its precision in an empirical study. Agrawal and Calantone (1995) purposed an additional criterion, the relevance of the model to actual practice. In pharmaceutical marketing, this additional criterion should signify the capacity of the model to help to formulate and implement the marketing strategy.

3.5.2 Comparison of the Models

3.5.2.1 Explanatory and Predictive Capacity

Most of the models presented so far have a comprehensive structure. However, their explanatory capacity is not strong enough to define interactions between the variables. As a result, it is not possible to identify the changeable relations between the variables. For example, Segal and Hapler's (1982; 1985) studies postulated that doctors' drug choice may vary according to the severity of the illness. However, their drug choice model neither explained how related variables interact with each other when the severity of illness changes, nor evaluated the importance of each of these variables in different patterns of illness. In a similar vein, Denig et al. (1988) suggested that doctors' decision-making and consequent prescribing behaviour were found to be related to the severity of the patient's disease. Although important, the type or severity of the disease were not components of the explanation offered by their behavioural prescribing models. Furthermore, interactions between, for example, the therapeutic category and the type or severity of disease should be identified in order to improve the model's explanation and prediction power. Nevertheless, Segal and Hapler (1982; 1985) and Denig et al.'s (1988) models encapsulate new constructs that "*appear to be important elements in the overall appraisal of a drug, and it is encouraging that, in the studies*

both of Segal and Hepler (1985) and Denig et al (1988), the actual drug choice could be predicted correctly" (Haaijer-Ruskamp and Hemminki 1993: 105).

A further drawback in terms of a model's explanatory and predictive capacity is that it is difficult to say why the marketing strategy works or do not work, if the model is not supported by a theoretical framework. This is the case with at least one of the 'behavioural'[5] models, the Hemminki (1975b) model. By neglecting to specify a concrete theory, Hemminki's (1975b) simplified model of the factors that affect drug prescription has a reduced marketing applicability. That is, it neither includes the cognitive processes of the doctors' decision-making nor the needs and values that guide prescribing behaviour.

Harrell and Bennett's (1974) model is very useful in explaining and predicting what product attributes exert a stronger influence on drug choice. However, no explanation was advanced as to why certain therapeutic options were chosen against other possible alternatives with the same product attributes. As pointed out earlier, substantial evidence has been found in the prescribing literature to confirm that there is no single, clinical context-free decision (Chinburapa et al., 1993). Therefore, explanatory and predictive capacity of any prescribing model is directly linked to the type and severity of the disease, which in turn incurs a

[5] The assumption was incorrect.

therapeutic approach that is guided by doctors' clinical values. This line of reasoning was partially present in Denig and Haaijer-Ruskamp's (1992) study. Furthermore, the assumption that the adoption of a drug from a specific "evoked set" may follow a heuristic process (Denig and Haaijer-Ruskamp, 1992) is in accordance with the clinical task complexity, which in turn was found to affect the doctors' information processing activity (Chinburapa et al., 1993). It has been postulated that increased task complexity results in the use of various simplified decision strategies in order to reduce information-processing demands and cognitive efforts on goal setting and goal striving (Bagozzi, 1992). Researchers in the sub-area of psychology that deals with attitudes have not considered goal setting and goal striving within the clinical context. As a result, the explanatory and predictive capacity of any prescribing model is diminished because the theories of reasoned action and planned behaviour were found to be unsuitable for goal setting and goal striving: "*Understandably, the theories of reasoned action and planned behaviour have been infrequently applied to the achievement of outcome goals, and when they have, typically very small amounts of explained variance result*" (Bagozzi and Edwards, 1998: 594).

In line with the reasoning that has been advanced, it is possible to argue that the explanatory and predictive capacity of any prescribing model is also dependent on both its capacity to elicit the cognitive schemas of

doctors in terms of type and severity of patients' diseases and its capacity to derive the clinical goals relevant to these doctors. That is, to improve the explanatory and predictive capacity of the prescribing model it is necessary to use it as a tool to investigate the hierarchical cognitive schemas of doctors with respect to their reasons for desiring to prescribe a therapeutic category against other therapeutic categories for a specific patient's type and severity of disease. In summary, a conjugation of volitional, motivational, and behavioural processes have to be present in a prescribing model to improve its explanation and prediction in terms of the selection of therapeutic classes for a specific patient's type and severity of disease. The model has to eliminate doubt about "*how the decision is made to include a therapy in the evoked set*" (Denig and Haaijer-Ruskamp, 1992: 12).

Only two of the models of doctors' prescribing behaviour (Segal and Hapler, 1982; Denig et al., 1988) explicitly presented their predictive power, with encouraging results showing that the actual drug choice could be accurately predicted. All the other models neither evaluated the level of prediction nor developed methods that would allows any observation of predictive power.

Assuming a hypothetical, but realistic, description of a antihypertensive drug, Knapp and Oltjen's (1972) research was undertaken to investigate subjective expectations about benefit (efficacy) and risks (side effects).

Although important, these drug pharmacological considerations are not enough to explain drug choice. As a result, its predictive power is not strong.

The Segal and Hepler (1982) model was assumed to have a high level of prediction (72% of the cases examined), while Denig et al. (1988) presented the best results (73 to 78% of the cases examined). However, Denig et al.'s (1988) model neither defined a general patient scenario, nor assumed behavioural intentions as a major construct. The former was a restrictive and unrepresentative patient scenario based on two different uncommon diseases (i.e., irritable bowel syndrome and renal colic), while the latter has been assumed as a precondition for action. As a result, the model's predictive power may be questioned because the patient scenario is poor in terms of doctors' daily clinical activity, and intentions have been found to be more effective predictors of behaviour as compared to overall attitude towards a product.

Denig and Ruskamp's (1992) model may be thought of as a promising future approach to doctors' prescribing behaviour. This new avenue for future research is, however, beyond the scope of this thesis. Furthermore, no empirical work has been conducted to test its predictive power.

3.5.2.2 Generality

Hemminki's (1975b) model is the less generalisable. She introduced into her doctors' prescribing model new dimensions such as the manufacturers' influences on independent research, undergraduate and postgraduate education, scientific journals and advertising, as well as control and regulations from health authorities, health insurance systems, and medicines committees. However, the model is not generalisable because there are deep differences within the E.U's members health care systems.

The Segal and Hepler (1982) model has low generalisability because the model was only tested on a small sample of family practice residents and staff doctors from just one practice site. Earlier evidence on differences between doctors' outcome values (Segal and Hepler, 1982), was not confirmed in their extended model (Segal and Hepler 1985). However, these differences may be present in other clinical settings. Thus, the results cannot be generalised to other types of prescribers or diseases, and additional research must be developed to test the homogeneity of values among different groups of doctors. All the other models have substantial generalisability, particularly Harrell and Benett's (1974) model. Miller (1974) and the Denig and Haaijer-Ruskamp's (1992) models should be assumed to be the most generalisable because they can be applied to a wide range of clinical contexts.

3.5.2.3 Heuristic Power

By the time they were presented, Knapp and Oeltjen's (1972) and Harrell and Bennett's (1974) models were interesting examples of high heuristic power because they pioneered the use of expectancy-value theory on doctors' prescribing behaviour. Their influence for stimulating new questions concerning drug therapeutic approaches was strong and recent studies on this field used a similar approach (Lambert et al., 1997; Segal and Hepler, 1982; 1985). The conflicting conceptual relationship between behavioural intention and behaviour, as well as volitional and nonvolitional behaviour presented in these studies are examples of such questions, and were introduced into discussions about the accuracy and usefulness of the TORA for predicting doctors' prescribing behaviour.

Although Miller's (1974) and Hemminki's (1975b) models did not present a theoretical framework that supports their empirical work, both of these models have a very high heuristic power, which is derived from their capacity to generate new questions for future research. The former introduces the Rogers' (1962) concept on innovative adoption in doctors' prescribing behaviour, while the latter incorporates new, important dimensions previously not included in drug adoption models. The same is true for Denig and Haaijer-Ruskamp's (1992) model, which must be regarded as a promising approach to drug choice.

3.5.2.4 Unifying Power

Knapp and Oeltjen's (1972) model is a rare example of unifying power in terms of the relationship between the clinical context and the therapeutic approach, because their model connects, for the first time, the risk or benefit of the drug with the severity of the illness.

Harrell and Bennett's (1974) model brings together and clarifies, for the first time, the relationships among "attitudes", "beliefs", "behavioural intentions", and "behaviour" in prescribing.

Several dimensions previously viewed as unrelated, were brought together in both Hemminki's (1975b) and Haaijer-Ruskamp and Hemminki's (1993) models. The unifying power of their model derives fundamentally from the capacity to inter-relate various institutional, social, and psychological variables. For example, control and regulations from health authorities, health insurance systems, and medicines committees, as well as demands and expectations of pressure groups and society at large, or even doctors' personal characteristics were linked to dimensions that had previously been found to be important to prescribing behaviour such as the pharmaceutical manufacturers' influences on independent research, undergraduate and postgraduate education, medical and scientific journals and advertising.

Miller's (1974) model has a strong unifying power that derives from its capacity to link the antecedent variables in the structure of drug adoption with the decision-making process and the therapeutic solution. Its unifying power is reinforced by the relationship that is established between the stages of adoption and the different sources of drug information, which were the routes to Hemminki's (1975b) model.

The capacity to bring together different concepts like the doctor's clinical past experience, professional environment and perceived patient demand gives Denig et al.'s (1988) model an encouraging unifying power.

Denig and Haaijer-Ruskamp's (1992) model reveals a substantial unifying power between two opposing paradigms of drug choice:

- rational problem solving; and
- unreasoned or heuristics processes.

3.5.2.5 Internal Consistency

The internal consistency of Miller's (1974) and Hemminki's (1975b) models apparently seems to be less strong than other models because they are general models that look for a simplified version of the panoply of factors that were found to affect drug prescription. Furthermore, none of them specify the direction or magnitude of the relationships between the different constructs.

The final version of Hemminki's (1975b) model (i.e., Haaijer-Ruskamp and Hemminki's, 1993 model) presents the same problem, which means that the internal consistency is again not strong.

The Miller (1974) model may present some hidden inconsistencies related to the different information sources that doctors were found to use in the different stages of adoption of a new drug. All the other models seem to be internally consistent.

3.5.2.6 Originality

In terms of the theoretical framework, both the Knapp and Oeltjen (1972) and Harrell and Bennett (1974) are the most original models. The former was the pioneering expectancy-value model, while the latter was anchored to Fishbein's (1970) investigation of relationships among ***attitudes***, ***beliefs***, ***behavioural intentions*** and ***behaviour***, as they apply to drug choice.

In terms of constructs, both the Hemminki (1975b) model and its final version (Haaijer-Ruskamp and Hemminki, 1993) can be regarded as the most original since they propose the introduction of new dimensions to embrace all the factors that were supposed to influence doctors' prescribing behaviour. Control and regulations from health authorities, health insurance systems, medicines committees and other health professionals are some of the factors that affect individual physicians,

partially considered in some previous descriptive studies, but never presented as structural constructs that provide a more systematic, conceptual approach to drug choice. The important distinction between factors that affect prescribing at the macro-level (so-called conditioning factors) and factors that influence individual physicians (micro-level) is an important step towards new approaches to drug therapeutic decision-making.

The inclusion of personal clinical experience and the value attached to this are two new major constructs presented in Denig et al.'s (1988) model, which gives it a substantial construct originality.

Denig and Haaijer's (1992) theoretical drug choice model is quite original. For the first time in the academic literature on drug choice, it was assumed that the both *reasoned and unreasoned decision-making* processes may be used by doctors when they prescribe a drug. However, "*Conclusive evidence in support one of these views over the other does not exist, and it seems possible that more than one model is needed to represent the prescribing process*" (Segal and Hepler, 1982: 1892).

3.5.2.7 Plausibility

Although plausibility does not necessarily indicate that the model is conclusive in its representation, it is necessary that it at least makes sense.

All the models discussed above have a strong face validity since all of them are the result of descriptive studies that have been developed to study partial realities relating to doctors' therapeutic approaches.

3.5.2.8 Simplicity

Zaltman and Wallendorf (1983) suggested that the simplicity of a model should be balanced with its capacity to include the main aspects of the phenomenon that the researcher wants to explain or predict. With the exception of Hemminki's (1975b) and Haaijer-Ruskamp's (1993) models, it can be argued that all the models have a significant simplicity because they are derived from Fishbein's (1970), Fishbein and Ajzen's (1975) and Ajzen and Fishbein's (1980) classic work on attitude theory: "*It is easy to operationalize and yields relevant policy implications in everyday settings*" (Bagozzi, 1992: 180). This simplicity explains the reduced explanatory and unifying power of the Knapp and Oeltjen (1972) model.

The introduction of constructs such as individual clinical experience in Segal and Hapler's (1982; 1985) and Denig et al.'s (1988) models did not alter their simplicity.

Lilja's (1976) model can be seen as moderately simple for an expectancy-value model. The same is true for Denig and Haaijer-Ruskamp's (1992) model.

3.5.2.9 Supported by Facts

The literature relating drug adoption with drug choice covers a large number of descriptive studies that suggest that most models were supported by facts at the time they were developed.

3.5.2.10 Testable, Verifiable

As pointed out earlier, Segal and Hepler's (1985) and Denig et al.'s (1988) prescribing models went further and integrated the role of opinions held in the professional environment (by colleagues, specialists and pharmacists), prior experience with the drug, and patient demand. Consequently, these models encapsulate new constructs that were recognised as important elements in understanding and explaining drug choice. In accordance with this assumption, Segal and Hepler's (1985) and Denig et al.'s (1988) prescribing models should be considered very testable and verifiable.

Harrell and Bennett's (1974) model, is also very testable and verifiable because it derives from, perhaps the most comprehensive framework for explaining consumer behaviour. The well-known work on attitude theory developed initially by Fishbein (1970) gives Harrell and Bennett's (1974) model a strong testable and verifiable capacity.

While Knapp and Oeltjen's (1972), Heminki's (1975b) and Haaijer-Ruskamp and Hemminki's (1993) models can be quantified and therefore

tested, Miller's (1974), Lilja's (1976), and Denig and Haaijer-Ruskamp's (1992) models do not appear amenable to testing in their present form. This is because of the structure of these models as they are more process oriented than construct oriented.

3.5.2.11 Marketing Strategy Application

Harrell and Bennett's (1974) experimentation with Fishbein's (1970) work on attitudes, intentions and behaviour was the first study presented to pharmaceutical marketing managers. Other models of doctors' prescribing behaviour had been developed to support health authorities' educational programmes for improving "rational prescribing behaviour" or for defining formulary list decisions (Freeman et al., 1993). Harrell and Bennett (1974), following Fishbein's (1970) conceptual approach toward attitude, changed the focus of attitudes toward *objects* to attitudes toward *actions*. This shift of focus was important, and brought to pharmaceutical marketing new conceptual considerations that were more congruent with actual prescribing. Harrell and Bennett (1974) argued that there was a strong intuitive support for measuring attitudes toward the *act* of prescribing, the brand and the resultant consequences of prescribing. This approach was considered better than the traditional view that assumes that knowing attitudes toward a drug brand (i.e., the *object*) would enable prediction of, and explain underlying reasons for the purchase of that brand.

Harrell and Bennett's (1974) findings were found to be important for pharmaceutical marketing applications, particularly on "***marketing decisions as product design, product positioning, and the development of promotional appeals***" (Harrell and Bennett, 1974: 277).

Denig et al.'s (1988) model was suggested to be the most useful to pharmaceutical marketing strategists because it is quite general (Agrawal and Calantone, 1995). Furthermore, this model is based on an algebraic formulation which provides marketing managers with the quantitative information they need to support their decisions. However, no explanation was advanced as to why the patient scenario was not representative of doctors' daily clinical activity.

Besides their capacity to generate theory formulation, the structure of the Hemminki (1975b) and Haaijer-Ruskamp and Hemminki (1993) models did not present any empirical work whatsoever on drug choice.

Segal and Hepler's (1982; 1985) models provide quantitative information which may be used for marketing strategy. However, they have an identical problem to that described for Denig et al (1988).

Miller's (1974), Lilja's (1976), Denig and Haaijer-Ruskamp's (1992) models have an interesting theoretical approach which can be used for designing marketing strategies. This is not the case with the Knapp and Oeltjen's (1972) model of risk-benefit assessment regarding drug choice.

3.6 Information Exchange Networks

The *sine qua non* of prescribing decision making is information. Accordingly, the doctor must seek information until (s)he knows what drug to prescribe. Since the GP's information-seeking process can involve many different information sources over an extended time, *a research framework is required to identify* ***information exchange networks*** *and their relationship to drug choice*. To accomplish this objective, we will develop a *literature review on doctors' social networks and their influence on drug choice*.

The primary goal of this study is to investigate GPs' prescribing behaviour. Part of this broad goal is to be accomplished by evaluating the influence of ***information exchange networks*** on drug choice. Successful marketing by pharmaceutical manufacturers to doctors is greatly determined by a good understanding of the various ***social networks*** that influence their drug choice. More specifically, it would be of benefit to pharmaceutical marketers to ascertain to what extent drug choice is influenced by doctors' **social networks**. *Information exchange networks* represent the ***contextual environment*** within which the doctor operates. That is, drug choice is only part of a more complex ***social network*** of drug use: "*But, as a social act with social consequences, drug prescribing is performed by doctors who are part of a complex social network*" (Parish, 1974a: 215).

In the primary care ***contextual environment***, doctors as a group have different preferences in terms of *communication networks*, but the *networks* are the main vehicle for doctors to update their prescribing behaviour (Linn et al., 1972).

More recently, some researchers suggest that *doctors practice within a* ***complex social and professional context*** *that was found to influence and to interact with their clinical activity* (Lambert et al., 1997; Peay and Peay, 1994; Raisch, 1990a;b; Pendleton, 1984). For example, Raisch pointed out that pharmaceutical manufacturers' representatives, opinions of colleagues and scientific sources of prescribing information are thought to influence prescribing decisions by influencing the thought process of the physician. These social and professional structures are composed of *friendships* and *expert opinion* or *consultations* (Eccles et al., 1996), and they comprise communication networks through which information, influence, and innovation flow, particularly on new drug adoption:

"*Hospitals, clinics and cardiologists have a significant impact on prescribing in general practice. Physicians in primary care rank hospital recommendations as one of the most important sources of information on new drugs*" (Feely, 1999: 31).

Coleman et al.'s (1966) study identifies the importance and influence of doctors' professional and social networks on drug prescribing and was considered to be pioneering research, providing a fundamental and most

suggestive understanding of the importance of *professional* and *social networks* to innovative prescribing behaviour (Peay and Peay, 1994).

Pitt and Nell (1988) also showed that drug choice is influenced by *professional* and *social networks*. Both the *manufacturer's promotional tools and interpersonal/organisational influences beyond marketers' immediate control were cited.* Interpersonal influences were seen as more informal procedures by which doctors changed their opinions and discussed prescribing with *colleagues*, *consultants*, *associates* and *friends*. Organisational influences were viewed as being somewhat more formal. They were related to doctors' clinical experience with products in their working situation, as well as hospital ward rounds and in-practice discussions.

The adoption of a new antibiotic was found not to be an entirely individual process because it existed in the context of ongoing interactions in the professional environment with *medical peers* as well as interactions with *external influences* (Coleman et al., 1966). However, *some studies on drug innovation have also failed to replicate many of the findings from the Coleman and colleagues' social networks perspective* (Peay and Peay, 1988; Christensen and Wertheimer, 1979). For example, *doctors who were highly integrated into social and professional networks did not adopt new drugs earlier than their peers*.

Although the specific variables tested and the samples and settings used in those studies varied, *no evidence was found to support the relationship between early adoption and participation in medical communication networks or activities outside the doctor's practice.* Neither was early adoption associated with age (Peay and Peay, 1988), or the number of medical journals received (Weitz, 1981).

These findings were in line not only with the results of an earlier study (Peay and Peay, 1984), but also with the Miller's (1974) work on new drug adoption. For example, Christensen and Wertheimer (1979) found that doctors used literature-based sources such as *medical newsletters, journal articles, medical texts and other written sources for general drug information and colleagues for information on new drugs*.

In summary, doctors have numerous social and professional sources of drug information. To provide some structure four our literature review, we arbitrarily classify[6] *the contextual clinical environment* and its *information exchange networks* as:

1. *health authorities clinical information*;
2. *medical education and colleagues opinion*; and
3. *pharmaceutical industry promotion.*

[6] This classification scheme is not meant to be a scientific typology, but merely a convenience for presentation.

3.6.1 Health Authorities Clinical Information

There are many ways to gather drug information from *the contextual clinical environment*, but doctors mostly were found to prefer and use printed information sources such as *medical journals* and *drug bulletins* (Denig et al., 1990; Plumridge and Berbatis, 1989). For decades drug bulletins have been produced by health authorities with the intention of improving the standard of therapeutic decision and, more recently, controlling drug expenditure. These drug bulletins are based on *medical guidelines* and are "***independent of the pharmaceutical industry****, presented attractively, and distributed efficiently and punctually to readers*" (Plumridge and Berbatis, 1989: 330). Again, studies of the impact of drug bulletins on prescribing practices have reported conflicting results. Although the impact of drug bulletins alone cannot be inferred, the interest of health authorities in this source of therapeutic information suggests they have a significant effect on rational prescribing. In Portugal, they were used for the first time in 1998. The therapeutic information provided by these new pharmacological source is based on medical guidelines developed by the World Health Organisation (WHO). During the last decade, the WHO has been involved in generating information on rational prescribing both for specialists and GPs (Couper, 1995). Most of this information was organised in accordance with medical guidelines for most common

diseases (Armstrong, 1996; Pathman et al., 1996; Mant, 1994). Therefore, these guidelines are considered *the most recent influence on drug choice*:

"*guidelines perform a function for any professional group by helping to define the best practice or 'the state-of-the-art'*" (Newton et al., 1996: 513).

These considerations have stimulated the publication of guidelines to assist physicians in the management of hypertension (Elliot, 2000). That is, these medical guidelines were developed in an attempt to change the GPs' inappropriate prescribing behaviour, particularly for the management of hypertension (WHO-ISO, 1999; WHO, 1996; WHO-ISO, 1993).

A recent study which sought to determine what proportion of patients with hypertension were managed in accordance with the guidelines established by the Canadian Hypertension Society concluded that there is some variation in the care of patients with hypertension (McAlister et al., 1997). As a result, the researchers suggested that further studies were required to determine the underlying reasons for doctors' non-compliance with the evidence-based guidelines established by the Canadian Hypertension Society. This was also suggested by Couper (1995) and Le Grand (1999).

Substantial variation between guidelines has also been pointed out: "*The international guidelines on the management of hypertension may use the same evidence but they are not explicitly evidence linked and do not always agree on recommendations in important clinical areas*" (Hutchinson, 1998: 1020).

Guidelines have been developed for 3 main reasons (Newton et al., 1996):

1. *to define the best therapeutic approach or "the state of the art"*;

2. *to evaluate medical practice in terms of drug prescribing against standards*; and

3. *to improve efficiency.*

The purpose of the medical guidelines on the management of hypertension are identical: "*The purpose of the guidelines is to assist practitioners in clinical decision-making, to standardize and improve the quality of the patient care, and to promote cost-effective drug prescribing. This guideline attempts to define principles of practice which should produce high quality patient care. They are attuned to the needs of a primary care practice but are directed to providers at all levels. The guidelines also serve as a basis for monitoring local, regional and national patterns of pharmacological care*" (Veterans Health Administration, 1996: 5).

Wensing et al. (1998) considered that "*the particular characteristics and specific problems found in general practice can influence the implementation of guidelines and innovations. For instance, the wide variety of symptoms and diseases seen in general practice (as a result of the general accessibility of primary health care) inhibits a strong focus on one particular guideline or innovation*" (ibid: 991).

In the Netherlands, the perspectives of doctors who are being encouraged or recommended to use guidelines in their every day work, were divided into two categories (Grol, 1990):

- general attitude towards clinical guidelines; and
- influence of clinical guidelines on drug prescribing.

Although Grol's (1990) study showed a generally positive attitude towards clinical guidelines, the results suggested that GPs in the Netherlands did not change their medical practice according to those clinical guidelines.

In a subsequent paper Grol (1992) described the barriers which may hinder the process of implementation. Whilst some of these barriers were related to the characteristics of guidelines themselves and the way they were disseminated, others concerned the doctor's personal characteristics, in particular age, clinical experience, self confidence, membership of professional associations, and attitudes. In general, GPs preferred methods for implementing medical guidelines that involved educational events and discussions with colleagues (Feely, 1999; Braybrook and Walker, 1996).

Studies of the impact of drug bulletins on prescribing practices have also reported conflicting results. For example, Watson et al. (1975) found that drug prescribing by Western Australian GPs who were sent guidelines for selected groups of drugs was more rational than prescribing by those who did not receive them. This approach was extended by Evans et al. (1986) who measured GPs' knowledge levels about ***hypertension*** before and then four months after receiving a written education package of practice-

oriented information. There was a statistically significant increase in knowledge levels in the group who received the package compared with a control group. However, a follow-up study conducted over 21 months showed no lasting effects on GPs' knowledge levels about *hypertension.* The authors of the study concluded that *the use of drug bulletins in institutional settings has a significant but short-term effect on prescribing.*

Other researchers hypothesised that printed information, such as in drug bulletins, influences GPs' prescribing behaviour by changing their knowledge of drug efficacy and adverse effects and their perceptions of drug utility. Two different disorders (renal colic and irritable bowel syndrome (IBS)) were included. However, the results were not very promising:

"*It is suggested that the message concerning IBS was seen as difficult to implement and perceived as less relevant. When this is the case, more intensive strategies are probably necessary to change knowledge, perceived drug utility, and prescribing behavior of physicians*" (Denig et al., 1990: 92).

These findings were in line with a previous study which stated that:

"*Although the factors that influence the success or failure of drug bulletins are still being clarified, it is apparent that many bulletins fail to appeal to their target audience*" (Plumridge and Berbatis 1989: 333).

3.6.2 Medical Education and Colleagues Opinion

3.6.2.1 Medical Education

Almost twenty five years ago, Hemminki (1975a) expressed some concern about the scarcity of studies on the influence of *medical education* on doctors' prescribing behaviour. In her review of the literature, she noted that relatively few studies were developed on the effects of medical education on doctors' prescribing behaviour. Furthermore, she considered that the *pioneer studies on the influence of medical education on drug prescribing reported different conclusions.* Segal and Wang (1999) suggested that new research on this topic was necessary. Following their advice, some researchers pointed out that medical education and clinical guidelines are supposed to provide doctors with the skills to practice medicine during their professional career (Gill et al., 1999; Kinderman and Humphris, 1995; Rimoldi, 1988; O'Hagan, 1984; Doran, 1984). These skills were considered critical for the development of an accurate diagnosis and subsequent therapeutic approach (Kinderman and Humphris, 1995). Therefore, *medical education* was found relevant not only for medical students, but also for post-graduate education on drug prescribing (Joyce et al., 1967). In their study of factors associated with cost and variation in prescribing among GPs, Carthy et al. (2000) suggested that *medical education* is also important to reduce prescribing uncertainty.

3.6.2.2 Colleagues Opinion

GPs have a personal list of drugs which they prescribe but "*each general practitioner guards jealously his personal list of drugs and may be sensitive about discussing it*". Nevertheless, "*It can be assumed that the personal list has its roots in the doctor's medical student career and is developed in early years in hospital practice. Following entry into general practice the trainee doctor comes under the direct influence of the patient in the primary care settings and is heavily influenced by the other doctors in the practice, particularly the trainer. It is easy to see that the number of teachers and peers involved in the development of the personal list is high, and these influences will continue to a lesser extent during the years as a principal in general practice*" (Gilleghan, 1991: 14).

With the advance of *expectancy-value theory on consumer behaviour* (Fishbein and Ajzen, 1975; Ajzen and Fishbein, 1980), the importance of collegial advice in terms of prescribing (i.e., the normative belief) became relevant: "*colleagues have significantly increased in importance as a source of information about pharmaceuticals for physicians. Marketers should design communications and marketing strategies to maximize word-of-mouth advertising and discussion among physicians*" (Williams and Hensel, 1991a: 57).

Peay and Peay (1990) suggested that *colleagues* may play a relatively minor role in the adoption process of a new drug. However, during the drug adoption process, *consultants* and *opinion leaders* are an important influence on their colleagues (Coleman et al., 1966).

In a more recently published study on GPs' attitudes towards drug prescribing in times of economic pressure, Himmel et al. (1997) found that continuing *medical education* and advice obtained from *colleagues* ranked highest as information sources for drug selection. Therefore, doctors' drug selection and its *acceptance by peers* was considered to be another important factor which influences prescribing behaviour (Chinburapa et al., 1987; Segal and Hepler 1982; 1985; Zelnio, 1982). However, contrasting findings have also been published:

"*In contrast to an earlier study, the role of peers was found to be relatively unimportant in this study. Chinburapa et al. (1987), utilizing the Fishbein Behaviour Intention Model as a conceptual framework in studying physician prescribing, found the subjective norm component (i.e., the social factor) to be significant in explaining physician prescribing intentions*" (Chinburapa and Larson, 1988: 15).

These contrasting results suggest that the influence of GPs' colleagues on drug prescribing may depend on the doctors' speciality (de Vries et al, 1996). For example, the adoption of high risk therapy and ongoing therapeutic innovation among specialists was found to depend on *colleagues' advice* (Peay and Peay, 1994). *However, the adoption process of specialists differs markedly from the adoption process of GPs*. In this case, not only was the process of adoption different from that followed by specialists, but the sources of influence on drug choice were also different.

3.6.2.3 Pharmacists and Clinical Pharmacologists

In the early years of this century when medicines were often complex mixtures, the pharmacist produced the medicine directly from its primary constituents (Gilleghan, 1991). Since the pharmaceutical revolution which followed the Second World War, the role of pharmacists has changed dramatically and they no longer produce the medicines. They now buy the finished products from the pharmaceutical industry. Meanwhile, GPs have tended to work in primary health care teams which have not directly involved community pharmacists, rather, the pharmacist has remained isolated in his shop. Therefore, the influence pharmacists had in the 1950's is no longer relevant (Caplow and Raymond, 1954; Winick, 1961). Even in the 1960's and 1970's, doctors rarely used pharmacists as source of drug information Williams and Hensel (1991a). During the 1980's, however, the use of clinical pharmacists as drug therapy consultants to doctors was a reality (Lipton et al., 1992). Pharmacists and doctors once again began working very closely together: "*The responsibilities of today's clinical pharmacist expand upon traditional functions and include assessing drug response, identifying adverse drug effects and drug-drug interactions, monitoring drug therapy and patient compliance, and conveying clinical information directly to physicians and patients*" (Lipton et al., 1992: 647). Studies in the 1990's have also reported an increasing role for pharmacists in influencing drug choice:

a therapeutic substitution formulary "*would guide pharmacists' judgements in the selection of a less costly alternative drug therapy for that prescribed by a physician from within these therapeutic classes*" (Pilkington and Dolinsky, 1991). Researchers also reported that clinical information provided by pharmacists to patients influences drug therapy (Bond, 2000; Morris et al., 1987). In the same vein, Roberts and Stokes (1998) demonstrated that the extensive clinical training of pharmacists can contribute to the quality of doctors' prescribing decisions. Even the introduction of patient information leaflets (PILs) developed by clinical pharmacists may influence drug choice: "*From January 1, 1999, in accordance with EU legislation (Council Directive 92/97 EEC), medicines dispensed in the Union must be accompanied by printed information written for the patient...The introduction of PILs will have profound effects on prescribing* (Collier, 1998: 1724). However, "*pharmacists are still unimportant as a source of pharmaceutical information for physicians*" (Williams and Hensel, 1991b: 35).

Boerkamp et al. (1992) argued that from a marketing point of view it was important to know if and how the interaction between hospital pharmacists and physicians influences their personal list of drugs. Since GPs' drug personal list has its roots in the doctor's medical student career and is developed in early years in hospital practice, *pharmacists* are assumed to be an important source of drug information.

3.6.3 Pharmaceutical Industry Promotion

The impact of drug manufacturers' commercial activities on drug choice has been recognised by different researchers in this field, even by those who are not in favour of such an influence (Couper, 1995; Gilleghan, 1991; Hemminki 1974; 1975a; 1976; 1988). For example, Hemminki (1975a) found that there are two major influences on a doctor's therapeutic approach: research and commercial activities developed by the pharmaceutical companies. Unsuspicious reports also considered that "*one of the most potent influences on doctors' prescribing is the pharmaceutical industry, which provides information at all levels and in many forms - written, verbal, and audio-visual*" (Gilleghan, 1991: 14). Furthermore, some members of the WHO expressed a growing concern about the influence of the pharmaceutical industry on doctors' prescribing behaviour: "*It is a sad reality, however, that in many countries, adequate information is not available even at the highest level of the health care system, and doctors are largely reliant upon promotional information from industry*" (Couper, 1995: 599). The influence of the pharmaceutical industry on therapeutic decision is not a recent phenomenon. Some researchers reported this influence during the 1960's and 1970's: Wegner, 1960; Wilson et al. 1963; Coleman et al., 1966; Dunnel and Cartwright, 1972; Worthen, 1973) For example, Dunnel and Cartwright found that GPs considered drug information from pharmaceutical manufacturers as one of the most helpful sources.

Wilson et al. (1963) also reported that the main source of influence on doctors' prescribing behaviour was the process of communication developed by the pharmaceutical industry. In some cases, doctors were not aware of this influence:

"*Although the vast majority of practitioners perceived themselves as paying little attention to drug advertisement and detail men, as compared with papers in the scientific literature, their beliefs about the effectiveness of the index drugs revealed quite the opposite pattern of influence in large segments of the sample*" (Avorn et al., 1982: 7).

The findings indicated that over half of the doctors interviewed perceived journal advertising (68%) and sales representatives (54%) to be of minimal importance compared to scientific sources such as professional journals and published clinical studies. However, the attitudes of doctors towards the two groups of drugs were inconsistent with the information published in scientific sources. Approximately half of the doctors who perceived that they were not influenced by "commercial sources of influence" also believed that these two drugs were very effective, as advertised by drug firms. These findings indicated that doctors were unknowingly influenced by advertising. *Such reasoning strengthens the argument that doctors may not be aware of the potential effect these commercial detailing techniques can have on their prescribing practices* (Roughead, 1998).

In order to understand the complexity of doctors' professional and social networks, some researchers initiated a debate on *scientific versus commercial sources of influence on doctors' prescribing behaviour* (Chen and Landefeld, 1994; Avorn et al., 1982). By questioning doctors about their beliefs regarding two drug groups (cerebral or peripheral vasodilators), Avorn and colleagues were able to conclude that the "*predominance of commercial rather than scientific sources of drug information represents a problematic area in health care delivery*" (Avorn et al., 1982: 7).

Gaither et al. (1996) pointed out that *commercial sources* were particularly relevant for new drug information, while *scientific sources* (e.g., *medical journals, doctor colleagues, medical textbooks, pharmacists*) were cited for information on existing drugs and actual prescribing decisions. Although drug promotion was found a powerful and effective tool, some researchers argued that when a doctor prescribes medication for a patient, the act is often shaped, to a large extent, by different factors (Armstrong et al., 1996; Gaither et al., 1996). For example, Gaither and colleagues argued that: "*the number of other physicians at the primary practice site, the number of patients seen daily, and the use of similar drugs moderates the effects of attitudes and/or subjective norms to use non-commercial sources of drug information* (Gaither et al., 1996: 1296/1297). Nevertheless, doctors' colleagues, medical journals, and pharmacists have

been the most common scientific sources of drug information that have been reported in recent studies (Himmel et al., 1997; Anderson and Lexchin, 1996; Gaither et al., 1996; Williams and Hensel, 1991).

Williams and Hensel (1991a) reported significative changes, not only in the sources and importance of various scientific/commercial activities, but also on personal/nonpersonal information as they relate to doctors' prescribing behaviour. For example, "*commercial sources of pharmaceutical information, specifically direct mail, journal advertising, and detailing, have declined significantly*" (Williams and Hensel, 1991a: 57). However, more recent studies on the influence of different sources of drug information on drug prescribing concluded that both scientific and commercial sources of drug information were important (Wazana, 2000; Cryer and Hrsistodoulakis, 1998; Anderson and Lexchin, 1996; Gaither et al., 1996; 1994).

Some authors pointed out that the use of drug information sources varied according to the newness of the information sought (Gaither et al., 1996; 1994; Williams and Hensel, 1991a;b; Peay and Peay, 1994; 1990). Nevertheless, not only were *scientific sources of drug information such as medical journals, medical text books, colleagues, and specialists reported, but also commercial sources of drug information such as sales representatives and symposia and conferences organised by the drug industry* (Wazana, 2000; Creyer and Hrsistodoulakis, 1998).

3.6.3.1 Pharmaceutical Manufacturers' Representatives

The typical pharmaceutical salesperson visits an average of eight doctors a day, with meetings lasting from five to eight minutes each (Soumerai, 1990). Doctors see the pharmaceutical sales representative (PSR) "*as an important source of information, yet they feel they could get the needed information without the PSR's assistance*" (Andaleeb and Tallman, 1996: 87). "*Although many studies, including that of Coleman et al. (1966) have documented the importance of the detail man in the adoption process, particularly in bringing first news of the drug to doctor, they failed to find a relationship between early innovation and frequency of contact with detail men. However, they contend that the absence of a relationship was due to the very high exposure of doctors to this information source* (Peay and Peay, 1994: 40). In a previous study, Peay and Peay (1988) reported that frequent contact with the pharmaceutical representatives was related to early drug adoption. However, different conclusions were obtained some years later by the same authors when they investigated the adoption of new drugs by specialists who treat serious disorders using relatively high risk drugs with potential serious side-effects (Peay and Peay, 1994). They concluded that commercial sources were not important for new drug adoption, nor did they exert much influence at the prescribing stage. Nevertheless, these researchers suggested that "*commercial sources may serve the function of providing information about drugs which are not central to the doctor's speciality, but that for drugs which are central, non-commercial sources*

are more important" (Peay and Peay, 1994: 50). They argued that the adoption of high risk drugs was determined by two factors, *preparedness to prescribe the new drug and the presentation of particular circumstances which were appropriate for its use.*

Almost twenty five years ago, Hemminki (1975a) argued that the level of influence of sales reps on drug prescribing depends on doctors' personal characteristics, working situation, and therapeutic opportunities. Pitt and Nel (1988) stressed that one of the most important findings of their study to the pharmaceutical companies was the relatively low importance that doctors placed upon the promotional work of sales representatives. GPs became more critical towards information from pharmaceutical companies (Ekedahl et al., 1995) because sales reps present only selected, usually positive, information about the products (Lexchin, 1997). Their activity was even reported to have a negative impact on patient health: "*Information provided by sales reps affects the course of treatment prescribed by physicians, and consequently, patients' health*" (Creyer and Hrsistodoulakis, 1998: 36). Therefore, GPs' intention to use sales reps as a source of drug information has declined. Many industry observers are aware of the change, but not all appreciate just how dramatic the shift has been: "*From 1992 to 1994, the number of sales representatives declined by 12 percent...But for the same time period, meetings and events increased by 31 percent*" (Vicciardo, 1995: 33).

3.6.3.2 Meetings and Events[7]

Pharmaceutical companies spent an estimated $500 million on meetings in 1994 (Vicciardo, 1995). Videoconferences and teleconferences accounted for about 15% of meeting activity, nearly doubling from only 8% in 1993. In the mix of traditional promotional activities, meetings and events are obviously being used to meet somewhat different strategic objectives: "*For certain products and certain situations, personal selling is still the best way to communicate, but budget constraints and staff cuts make it necessary to supplement it with other promotional techniques. Survey results show that meetings and events are one of the techniques companies are increasingly turning to in order to get their messages across*" (Vicciardo, 1995: 36).

3.6.3.3 Drug Advertisement in Medical Journals

Stimson (1977) takes the position that the problem with drug advertisements as a source of therapeutic information is that they provide hardly any therapeutic information:

"*Analysis of drug advertisements indicate that they are limited as vehicles for providing scientific information about the usefulness of drugs*" (Stimson, 1977: 12).

[7] The term "meetings and events" covers a wide range of promotional activities developed by pharmaceutical companies. It can range from informal dinners with a small group of GPs to large symposia or conferences attended by several hundred doctors.

Nevertheless, drug advertisement in medical journals, meetings, conferences and personal contacts developed by manufacturers' sales representatives, were found to have a strong influence on drug choice (Gemignani and Shaw, 1998; Gaither et al., 1996; Barton, 1993; Avorn et al., 1982). Printed advertisements, together with face-to-face visits by representatives, were found to be the most important commercial influences on prescribing (Plumridge and Berbatis, 1989; Stimson, 1976), particularly on new drug promotion: "*Typically, the initial promotion of a new drug is accompanied by extensive advertisement of its virtues - often a useful way of bringing a product to physicians' attention*" (Avorn et al., 1982: 7). In contrast, Ring (1986) suggests that *medical journals* and *scientific articles* are the major source of drug information and thus they are an increasing source of competition for pharmaceutical manufacturers. Ring also noted that the increasing number of medical publications in the early 1980's was a consequence of this growing pressure on product advertising. Some researchers pointed out that when an effective sales theme was employed, *medical journal product advertising* was found to increase a product's market share. Product advertising success was found to be dependent on three different levels of campaign awareness (Cearnal, 1989):

1) Recognition of the advertisement;
2) Association of the product with the campaign; and
3) Association of the product with the sales theme.

The influence of drug advertisements in medical journals has been questioned (Jones et al., 1999). Some articles have suggested that regulations developed to control drug advertisement were based on the "*notion that advertisers are capable of programming the minds of prescribers to produce prescriptions for their product regardless of approved indications*" (Dickinson, 1992: 64). In a similar vein, Taylor and Bond's (1991) study suggested that GPs were not unduly influenced by commercial sources of drug information and their prescribing habits were found ***stable and conservative.***

Identical conclusions were reported by Mackowiak and Gagnon (1985) who found that pharmaceutical companies' promotional tools were not the main and primary source of new drug information within the communication networks. They studied the effects of *detailing visits* to doctors and *medical journal advertising* on the primary and secondary demand of *diuretics* and *benzodiazepines*. The number of new prescriptions for a product was used as a measure of advertising effectiveness. The study found no correlation between changes in detailing or journal advertising expenditure and primary or secondary demand. For this reason the authors concluded that *drug manufacturers should evaluate the effects of reductions in their promotional expenditures, changes in promotional content, as well as seek alternative methods of advertising.*

In accordance with these findings, Mackowiak and Gagnon (1985) suggested that pharmaceutical manufacturers would have to rethink their communication strategies. However, *this study had limitations concerning the indicator used to measure advertising effectiveness. Even though the ultimate function of the advertising is to increase sales, the intermediate variables (i.e., doctors' beliefs and attitudes concerning the advertised drugs) should also be measured in order to better determine advertising effectiveness.*

Criticism of the scope of drug advertising usually focuses on its influence on inappropriate prescribing. However, Smith (1977) reported that there was unsubstantiated evidence that pharmaceutical manufacturers influence doctors to prescribe drugs inappropriately through journal advertising. Since journal advertising might influence drug prescribing in conjunction with other factors (Jones et al., 1999), it becomes difficult to study the effect of drug advertising separately. Therefore, Smith (1977) argued that:

doctors "*have excellent measures available to them as a defence against bad advertising: (1) They need not read them, (2) they need not believe them, and (3) they need not do what the advertisements suggest. Physicians who criticize drug advertising as the solo cause of poor prescribing seem very similar to the people who complain about the quality or content of television programs which they, nevertheless, watch night after night*" (ibid: 1221).

3.6.3.4 Product Characteristics/Attributes

Almost twenty-five years ago, pharmaceutical product characteristics such as appropriateness, effectiveness, safety and economy (i.e., cost) were considered the four most important criteria for rational prescribing (Parish, 1974). During the last 20-30 years, these criteria have also been used to determine whether drug choice is in line with health authority guide-lines (Audit Commission, 1995). However, "*The values assigned to the decision criteria may vary for different physicians and different problems. For example, when choosing a drug for a various serious disease, efficacy may be seen as the most important criterion. For a self-limiting disease, adverse effects and costs might be valued as more important*" (Denig and Haaijer-Ruskamp 1992: 11). Recently, however, product cost has became the major factor of analysis in terms of doctors' prescribing behaviour because "*Prescription drug prices have increased two to three times faster than all consumer prices since 1981 and have become a source of growing concern for policy makers, as well as individual and institutional purchasers*" (Lipton, 1988: 10). Therefore, "*The major factor promoting the assessment of prescribing by general practitioners is concern about the rate of increase in the total bill in all European countries*" (Buckley and Allen, 1995: 22). In a similar vein, Himmel et al. (1997) have provided evidence showing that:

"*In many European countries drug prescribing by primary care physicians has also become a matter of economic concern*" (Himmel et al., 1997: 164).

Several studies have been conducted on the influence of *drug cost* on doctors' prescribing behaviour but they have had conflicting results (Himmel et al., 1997; Denig and Haaijer-Ruskamp (1995); Safavi and Hayward (1992); Ryan et al. (1991); Chinburapa et al., 1987; 1988; Segal and Hapler 1982; 1985; Zelnio 1982; Zelnio and Gagnon, 1979; Lilja 1976; Miller, 1973; Caplow and Raymond, 1954). For example, Safavi et al. (1992) analysed the effects of price information on physician prescribing patterns. The results suggested that doctors neither have adequate knowledge of drug costs nor consider costs when prescribing. German GPs, however, were found to have a drug cost oriented approach:

"*Fewer drugs, less expensive drugs, fewer "patient-demanded" drugs, more generic drug prescriptions*" (Himmel et al., 1997: 168).

During the 1980's, following health authorities' drug cost-effectiveness information, doctors were reported to be aware and sensitive to the importance of price as regards patient compliance with a therapeutic regime (Lavizzo-Mourey et al., 1990). More recently, research on attitudes towards, and knowledge of, GPs prescription drug costs revealed a growing importance of drug costs in therapeutic decisions (Green, 1997; Denig and Haaijer-Ruskamp 1995; Walzac et al., 1994; Ryan et al., 1991). However, these studies recognised that doctors often made inaccurate assumptions about the cost of the drugs they prescribe.

Some researchers argued that "*when a physician attaches a low value to cost...information about cost will have little influence on the drug utility as perceived by the physician*" (Denig et al., 1990: 87).

Elderly patients are willing to pay more for *effectiveness* and *safety* of antihypertensive drugs: "*Our pilot study indicates that elderly patients are concerned about safety and effectiveness and are willing to pay more for these qualities in their antihypertensive drugs*" (Ferguson et al., 1994: 61). In general, it has been concluded that *effectiveness* and the importance of *side-effects*, as well as the availability of *dosage forms*, *dosage schedule*, and *ease with which the drug can be administered* were the most important attributes in drug choice (Himmel et al., 1997; Chinburapa et al., 1987; 1988; Segal and Hapler 1982; 1985; Zelnio 1982; Zelnio and Gagnon, 1979; Lilja 1976; Caplow and Raymond, 1954). In Chinburapa and Larson's (1988) study, the *side-effects* of a drug was the most important attribute, followed by *effectiveness* and *dosage schedule*. *Cost*, and *acceptance by peers* were reported to have less influence on drug choice. With regard to the relative importance of drug attributes in influencing prescribing intention, Chinburapa et al.'s (1988) findings were similar to previous research on this topic, which suggested that *side-effects* and *effectiveness/efficacy* were the two most important attributes in doctors' prescribing decisions (Chinburapa et al., 1987; Segal and Hepler, 1985; 1982; Lilja, 1976).

For example, Chinburapa et al. (1987) studied the relative importance of drug attributes among health maintenance organisation (HMO) and fee-for-service (FFS) doctors with reference to the beta-blockers used to treat hypertension and reported the same five characteristics in both cases. In descending order of importance, these were:

1. patient compliance,
2. efficacy,
3. dosage schedule,
4. side-effects, and
5. source of drug information.

In a later study, Chinburapa and Larson (1992) determined the importance of side effects and outcomes (i.e., the control of disease, convenient dosing and cost) in doctors' differentiation of drug products used to treat hypertension, alergic rhinitis, and gastroesophageal reflux. In addition, the study examined whether the importance of particular characteristics attributed to a drug varied according to the practice setting. They concluded that the practice setting did not have a significant influence on doctors' beliefs or on the importance of results in any of the three prescribing scenarios. The effective control of disease was reported to be the most important result in all the three prescribing scenarios, followed by individual side effects. The difference between these findings and previous

research on this topic (Chinburapa et al. 1987; Chinburapa and Larson, 1988; Denig et al. 1988; Lilja, 1976) was that "*not all side effects are equally important in their influence over drug preference and choice*" (Chinburapa and Larson, 1992: 341).

In the case of a new drug adoption, the product attributes that influence the therapeutic decision making may be different. For example, Rao and Yamada (1988) identified a number of product attributes that influence the prescribing decision of a new drug:

- innovativeness as compared to substitutes
- effectiveness as compared to substitutes
- riskiness to the patient
- range of ailments for which appropriate
- seriousness of conditions for which prescribed
- frequency of prescription (by the physician)

The attributes selected also vary according to the type of disease. For example, Freeman et al. (1993) suggested that adverse drug events such as side-effects, drug interaction and risk for dependency influence general and family practice physicians' prescribing behaviour on the treatment of patients with panic disorder. The findings from the Freeman et al. (1993) study reinforced the conclusion that after safety concerns are resolved, doctors select drugs to treat panic disorder on the basis of the product's ability to resolve the patient's complaints.

3.7 Patients' Characteristics

Since a long time, drug prescribing was found to depend on the type of illness the patient presents (Wilson et al., 1963). These researchers pointed out that GPs' first-line drug therapy varies according to the patient's *type of disease*. They assumed that prescribing for patients with *chronic and severe diseases* is different from patients with *acute or common diseases*. As pointed out in Chapter Two, hypertension is a *chronic and severe disease*. In a recent study, the *seriousness of disease* and the *patient's condition* were also reported to be important predictors of doctors' prescribing behaviour: "*The results of the present study suggest that when the patient's condition is serious and the drugs used to treat it have a relatively high level of risk, drug "adoption" and "innovation" are qualitatively different processes from those prescribed in traditional studies*" (Peay and Peay, 1994: 49). Therefore, in the most *unusual and risky clinical situations* the drug is selected according to the *consultant or a peer colleague's opinion*. In contrast, *in a routine situation where the disease is not severe*, the *promotional efforts of the pharmaceutical industry were considered to be the main influence on drug prescribing*. Identical findings were reported in studies developed in Asia and South America, in which the doctors' perceptions about pharmaceutical companies' promotion varied in accordance with *the type of disease or the therapeutic area* (Liu, 1995; Zarate and Liosa, 1995).

Wilson et al. (1963) argued that two doctors may learn to hold the same attitude toward a given stimulus (i.e., the patient disease) but they may assume different responses when facing the same problem, because of previous clinical experiences. Although their attitudes towards the patient's pathology may initially predispose them to behaving in the same way (i.e., *in accordance with common medical education for treating the specific condition*), the prescribing behaviours they ultimately come to exhibit may differ. The therapeutic approach will in fact depend on the degree to which their knowledge of the disease and its treatment has been reinforced by *clinical information they have received from the contextual environment*.

In some studies patients were found to have only a slight influence on doctors' prescribing behaviour (Worthen, 1973). In line with this conviction, Pitt and Nel (1988) argued that patients exercise the role of buyers and users, but they have little or no influence on drug prescribing. The same opinion is shared by different researchers who argued that patients have no importance whatsoever as a source of information or influence on drug prescribing (Avorn and Soumerai, 1983; Winick, 1961). A later study confirmed the low influence of patients on drug choice (Denig et al., 1988). However, Freeman et al. (1993) refused to accept the findings derived from the previous studies and suggested that the patient's clinical characteristics were a major contribution to GPs' drug choice.

In a similar vein, Benson's (1983) study provided evidence showing that:

- Patient characteristics (socio-demographics and clinical factors) were found to be the most important variables across the three decision stages.
- Clinical factors such as diagnosis and the level of impairment were highly significant in the first two stages, whilst socio-demographic characteristics (such as age) were the most important factors in the third stage (drug dosage determination).
- The effects of practice setting characteristics on doctors' prescribing behaviour were relatively low.
- Doctor characteristics (education, socio-demographic, and attitudes) varied in importance across the decision stages. Doctors' attitudes were significant in the first stage.
- Educational factors were highly significant during the first and third stage, while doctors' socio-demographic factors had little effect across the three stages of the decision process.

Patient **age** was also an important factor influencing drug prescribing (Lipton et al. 1992; Lipton, 1988; Hadsall et al., 1982). Besides **age**, ***gender*** was also an important factor in doctors' prescribing behaviour. For example, Hartzema and Christensen (1983) studied the prescribing

patterns of 80 family practitioners in a health maintenance organisation (HMO) and found that the size and age composition of the patient panel accounted for 45.7% of the variation in the prescribing rate. In addition, *female patients* were found to prefer to *see female doctors* and older physicians tended to have older patients than young doctors did. In line with this reasoning, older doctors were assumed to have higher prescribing rates because *older patients generally have more chronic diseases and require more drugs than younger patients.* This assumption was confirmed by Linn and Linn (1982) who assessed the effects of patient age on doctors' prescribing behaviour. The study found significant differences in the number of prescriptions given to young and old patients: " *While use of the medications did not differ between physicians for patients as a total group, they did differ when age of the patient was taken into account*" (ibid: 1531).

Rokstad et al. (1997) examined the prescribing patterns among GPs in Norway in relation to the patients' **age** and **sex** and found that *female* patients were receiving a greater number of items prescribed per patient contact (male 0.76, female 0.83). Insomnia was the most frequently recorded diagnosis for prescribing. Listed second were upper respiratory tract infections (males) and anxiety (females). Hypertension was the third most common diagnosis.

Research focusing on **gender** differences in doctors' prescribing decisions has found that doctors appear to be more likely to prescribe drugs of all types for women than for men (Hohmann, 1989).

Ethnic and/or racial differences were also found to influence doctors' drug choice (Hui and Pasic, 1997). By assessing the management of *hypertension* in Asian Americans and comparing it with an *age-and sex-matched group of white patients with hypertension*, these researchers concluded that *medication changes*, *dose reduction*, and the experience of *side-effects* were all more frequently recorded among American Asian patients than among American white patients.

More than thirty years ago, Coleman et al. (1966) introduced the question of the patients' income as an influence on drug prescribing. They reported that those doctors who were more 'patient orientated' may consider *price* as an important variable in drug choice. Their findings support the view that doctors who have a relatively high proportion of *higher income* patients prescribe more recently marketed and more expensive drugs than those physicians with a relatively high proportion of lower income patients. However, Lilja (1976), found, in his sample of Swedish physicians, that *drug cost* was accorded little importance in antidiabetic prescribing but was considered more important than *side-effects* in choosing an antibiotic.

3.8 Doctors' Personal Characteristics

Although the patient's clinical conditions have been described as relevant to doctors' prescribing behaviour, influences other than the patient's clinical conditions and the 'scientific' analysis of the treatment of the patient's conditions are present in the GP's decision to prescribe a particular medication (Armstrong et al., 1996). From a prescribing point of view, GPs' *personal characteristics* have been reported as one of the most important influences on drug choice (Steffensen et al., 1999).

Doctors differ not only in how much and how often they prescribe, but also on what they prescribe (Joyce et al., 1967). This is because doctors tend to have their own "educational programs" and also differ in terms of methods and learning styles. Moreover, these "educational programs" are often different from the medical institutions' stated programme. As a result, *individual **cognitive** styles, coupled with the various practices and habits which students observe during clinical clerkships, provide doctors with a specific therapeutic knowledge which may be different from that contained in the curriculum for pharmacology or therapeutics*.

Doctors' **age** and **clinical experience** were found to be responsible for the great variety of prescribing patterns. For example, Stolley et al.' (1972) study reported that *younger* doctors have a better quality of prescribing, tended to consult more with their colleagues and placed a higher value on

their profession. These *young* doctors were found to inform patients more about drugs and treatments. These prescribers were more satisfied with their formal medical training and *more critical of pharmaceutical manufacturer's promotional activities*. They relied more on *medical sources of drug information*, sought more data on drug contraindications, and were more dissatisfied with existing sources of drug information.

Other researchers also agreed that ***young doctors*** *have a different prescribing behaviour than their* ***older peers*** (Haayer, 1982; Hemminki, 1976; Miller, 1973, 1974; Coleman et al. 1966; Wilson, 1963; Menzel and Katz, 1955). For example, Coleman et al. (1966), following Menzel and Katz (1955), attempted to differentiate the *innovators* from *later adopters* in order to define their *personal characteristics*. They argued that drug prescribing by *innovators* was influenced by the social groups to which they belonged. It was, therefore, relevant to define these social groups in terms of demography, age and specialisation. Their study suggested that the *innovator* is a professionally oriented, *younger* doctor with a broad scope of attention to the medical world at large, yet one who participates closely in his/her own medical community. Their work demonstrated the complex role of social networks among doctors (both professional and social) in the various stages of the new drug diffusion. For example, GPs were found to consult *colleagues* (i.e., the innovators) more often in cases

of chronic disease, which has many possible therapeutic approaches and more ambiguous outcomes, than in acute cases. As a result, these *innovators* were cited more frequently by *colleagues* as a professional or social contact and were more likely to participate in out-of-town meetings, and to visit out-of-town institutions. They found that important interactions also occurred through shared offices, informal relationships with their peers, institutional ties, and contact with manufacturers' salesmen.

These *innovators* also tended to subscribe to a larger number of *medical journals* and to have more complex social and professional networks (Menzel and Katz, 1955). In a similar vein, Haayer's (1982) study suggests that *rational prescribing depends on* ***doctors' characteristics*** rather than on ***patients' characteristics***. Haayer assumed that there are multiple factors influencing doctors' prescribing behaviour, but in particularly their age. ***Younger doctors*** were more innovative and prescribed drugs more rationally then *older peers*. However, doctors' **age** was not an exclusive personal characteristic affecting drug prescribing. In a similar vein, some researchers concluded that rational prescribers tended to have *more post-graduate medical education, but fewer years of medical experience* (Benson, 1983; Stolley et al., 1972).

Practice characteristics were also described as being an important influence on drug prescribing (Gaither et al., 1996; Pharoah and Melzer,

1995; Hemminki, 1975; Williamson, 1975; Becker et al., 1972; Stolley et al., 1972). For example, Gaither and colleagues concluded that *the number of other doctors at the practice* and *the number of patients seen daily* are two important factors that "*moderate physicians' patterns of usage of drug information sources, and therefore influence drug prescribing*" (Gaither, et al., 1996: 1291).

Raynes (1980) found indications that some GPs develop particular routine approaches to the patient, which they use regardless of the symptoms presented. These routines were also important to drug choice. Raynes' (1980) findings suggested that ***older*** doctors have more ***conservative prescribing habits*** than their *younger peers*.

From Knapp and Oeltjen's (1972) point of view, both *the severity of the disease and the doctor's speciality* are relevant when determining the *relative weighting of benefits and risks given to drugs used in the treatment of hypertension.* For example, for milder cases of hypertension, the hospital doctor (i.e., internists) weighed the benefits of a drug more heavily than the risks of the drug, while the GPs were more concerned with the risks than benefits. For more severe hypertension cases, the relationship was reversed. Internists weighed the risks of a drug more heavily than the benefits, *while the GPs were more concerned with the benefits than the risks.*

3.9 Doctors' Philosophies of Prescribing

The ***type of disease*** was an important determinant of whether doctors took a "***conservative***" or a '***risky***' approach to prescribing. This was also suggested by Rawlins (1984) who pointed out that *pharmaceutical companies categorise GPs as "**conservatives** or "**risk takers**" and have different marketing strategies for these two groups*.

Linn et al., (1972) argued that beyond *clinical experience*, the ***general philosophy of medication*** influences the therapeutic decision. Physicians who prefer more *professional sources of information* (medical journals and peers recommendation) would be more likely to express ***conservative*** attitudes towards what constitutes legitimate drug use. Based on these findings, Linn et al (1972) *suggested that future investigations should attempt to define and differentiate these **philosophies of medication** in more detail*. In line with these ***philosophies of medication***, Mapes et al (1977) proposed that doctors' prescribing behaviour was influenced by their ***philosophical approach to medical practice***. They supported the view that there is both a "***conservative prescribing***" approach and an "***incautious prescribing***" approach. The former was found to be developed by ***older doctors***, while the latter occurs most of the time with ***younger innovative doctors***, who were inclined to prescribe a new drug more readily than their peers.

3.10 Discussion

Most cognitive models described in the beginning of this Chapter were based on the exctancy-value theoretical framework. No alternative behavioural model has yet been proposed, though frequent reference to the "prescribing habits" of doctors betrays behaviourist assumptions on the part of some researchers in the prescribing field. However, "*both schools of psychology can account for quite complex behaviour of humans in situations of choice, such as drug selection by doctors, and both run into difficulty accounting for certain aspects of verbal behaviour. The truth of the matter may be that drug selection by doctors is a mixture of rational or thought out behaviour and habit, depending on familiarity of the problem or other such variables. Yet behind the habits there may be poorly recalled or subconscious constructs which are essentially rational. Likewise, behind the stated rationales there may be untested assumptions or habits of thought*" (Bradley, 1991; 283). Nevertheless, most researchers on therapeutic decision making believe that the cognitive model, with different research approaches, is the best paradigm[8] for predicting and explain drug choice (Gaither et al., 1996). Within this cognitive paradigm, therapeutic decision making proceeds in an incremental way such that *clinical problem solving* is broken down into a sequence of choices to be made with simplification of the alternatives:

[8] We regard *paradigms* as established general models for doing research, without domain-specific theoretical content. In contrast, research approaches includes both theoretical and methodological guidelines that clearly limit issues of interest and the ways in which research is carried out.

"*By carefully studying expert physiscians solving a problem involving considerable uncertainty and risk, we can infer properties of the underlying knowledge representation and reasoning strategies they use to make difficult decisions. The analysis focuses on two separate but related aspects of the knowledge representation:*

- *The strategy for imposing structure on the decision problem, to decompose it into a set of manageable steps;*
- *The cognitive representation for likelihoods*" (Kuipers et al., 1988: 178).

In line with these considerations, Kuipers and colleagues recognised not only the importance of *prescribing-relevant knowledge structures*, but also the importance of *cognitive processes*.

Unfortunately, there has been little study of the contribution of personal prescribing knowledge to therapeutic decision-making in general practice, but antihypertensive medical guidelines suggests that it may be the most important distinguishing feature. As we will see later, the expectancy-value theoretical framework does not recognise the way *prescribing-relevant knowledge* is stored and organised in doctors memory. Most published studies have attempted to model the internal processing of doctors as they make prescribing decisions (i.e, cognitive processes), and most have used expectancy-value type models such as the theory of reasoned action. Nevertheless, this theoretical framework, along with the social system of influence and information flow, were very important to our research. However, these studies suffer from some deficiencies:

3.10.1 Practical Problems and Contradictory Findings

The contradictory findings in some studies were assumed to be linked to difficulties in securing collaboration from doctors (Himmel et al., 1997; Lambert et al., 1997; Haaijer-Ruskamp, 1990). This problem was also identified by Hemminki (1976) who reported the following difficulties:

- prescription figures are not available;
- doctors are not very willing to talk about their prescribing behaviour;
- the drug industry, considered one of the most important influencers of drug choice, is often unwilling to let outsiders study its activities.
- most pharmaceutical companies were found to be uncooperative in giving information on prescribing behaviour; and
- the subject of the study requires both medical and pharmacological knowledge, which non-medical researchers may not have.

In a similar vein, Haaijer-Ruskamp (1990) pointed out that "***Besides the methodological and theoretical problems to overcome, the researcher in this field is faced with a number of practical problems...One such problem is the privacy of some data bases...A completely different type of practical problem that researchers encounter is the importance of the often conflicting interests of those involved in drug utilization. There are the policy-makers who decide on issues of public health, the pharmaceutical industry with its own interests, the pharmacists who at the one hand want to be guardians of the quality of drug therapy, but on the other hand have their own financial interests, the physicians who often feel threatened in their autonomy and the patients who demand drugs***" (Haaijer-Ruskamp, 1990: 95).

Recently, Himmel et al. (1997) described difficulties with obtaining a satisfactory response rate in Germany. Given these limitations, it is, therefore, not surprising that in some of these studies several factors were found to be valuable in predicting drug choice, while in others they were unimportant: "*These intervention programmes, however, show conflicting results*" (Denig and Haaijer-Ruskamp's, 1992: 9). "*Serious disagreements in the literature about what variables are actually correlated to adoption illustrate this problem*" (Hepler et al., 1981: 30). Studies evaluating interventions aimed at improving prescribing behaviour also reported contradictory findings (le Grand et al., 1995). Furthermore, "*the past 30 years of research in prescribing have furnished descriptive data concerning the prescribing patterns and habits of physicians, **but a multi-dimensional analysis of prescribing behavior has not yet appeared in the academic literature***" (Mackowiak and Gagnon, 1985: 1191).

3.10.2 Different Periods of Research

Gaither et al. (1996) pointed out that methods, materials and length of investigation vary deeply among the most representative studies on the sources of drug information that influence prescribing behaviour. A great number of them were performed during the 1970's and 1980's and for this reason they do not reflect deep changes to the actual clinical context of doctors' decision-making and their therapeutic approach (Freeman et al., 1993). As a result, no generalisations could be made from these studies.

3.10.3 Different Clinical Realities Between Countries

Doctors' prescribing behaviour is influenced by several medical and non-medical factors that are interrelated with the specific clinical context in which prescribing occurs (WHO, 1999) and this may help to explain the incoherent picture created from most of the previous research.

Bloor and Freemantle (1996) pointed out that in the Netherlands, information is provided to prescribing physicians on the relative value of drugs in practice. In France, a national contract has introduced national medical guidelines for doctors with respect to diagnosis and treatments. In Germany, budgetary restrictions were introduced in January 1993 that placed a limit on drug costs. In this country, guidelines were introduced in 1995 to define the average prescription volume for each medical specialty according to therapeutic use and category of drug. The guidelines were formulated so that the total volume of prescriptions does not exceed the regional budget and are therefore used as a means of budgetary control. Physicians are reviewed on the basis of these guidelines, and if their prescription level is more than 15% above the average they receive a visit from pharmaceutical advisers to discuss their rates of prescription. In a similar vein, individual general practice budgets have been introduced in Britain (through the practice level fundholding and indicative prescribing schemes) and are being considered in Italy. Several European countries

have information feedback systems for physicians similar to the English prescribing analysis and cost (PACT) scheme. However, most of these strategies are not enforced, and information may be ignored. This is thought to be the case in Portugal, where data on prescription costs in relation to consultations are tracked and fed back to doctors to enable them to monitor their own prescribing patterns. In Portugal, as in other European countries, prescriptions are collated by a national authority and information is fed back to general practitioners on a quarterly basis, either in a simple "headline" format or in more detail when this is requested or when a practice's costs are substantially greater than the local average (Infarmed, 2000b).

3.10.4 Sample Size

There are several factors which affect the determination of sample size (Moutinho et al., 1998). If the target population is heterogeneous demographically, but homogeneous with respect to a profession, questions relating to professional conduct may be collected using a smaller geographic sample frame. If the questions are attitudinal in nature, however, a smaller geographic sample frame will not suffice, even if the questions are related to the profession. When questions are attitudinal in nature, however, as is the case with most of the studies on doctors' prescribing behaviour, a large sample is required. In line with this

reasoning, it is possible to argue that several different studies on doctors' prescribing behaviour (Lambert et al., 1997; Himmel et al., 1997; Mancuso and Rose, 1987; Segal and Hepler, 1982; 1985; Epstein et al., 1984; Harrell and Bennett, 1974) have an inappropriate sample size:

- Harrell and Bennett (1974) concluded that the sample used in their research was not the most convenient;
- Bradley (1991) argued that the disappointing results obtained with the Epstein et al.'s (1984) model were related with the sample size;
- Segal and Hepler's (1985) results contradicted Lilja's (1976) conclusion about the little importance of drug cost in the treatment of diabetes mellitus. This may have occurred because (like its predecessor in 1982), Segal and Hepler's (1985) study presented some sampling limitations. The former used a convenience sample with only 55 respondents, while the latter collected information from 40 prescribers; and
- Mancuso and Rose's (1987) research is another example of inappropriate sample dimension, as is Lambert et al.'s (1997) study: "*although the sample was small, it was larger than that used in some published studies of clinical decision-making (Mancuso and Rose, 1987), and, more importantly, tests had sufficient power to detect effects of the expected magnitude*" (Lambert et al., 1997: 1772).

3.10.5 Doctors as the Main Source of Information

Medicine has remained a prestigious profession based on scientific and complex rules, managed by ancient and respectable institutions and which provides medical education in a hermetically closed environment (Haaijer-Ruskamp and Hemminki, 1993; Devlin, 1990). Doctors, as gatekeepers of these values, are not necessarily reliable sources of information (Lomas et al., 1989) since the account they are willing to report may be influenced by their assumption that prescribing behaviour is rational and scientific because they want to preserve their image as competent technicians: "*Of course, what physicians say they'll do and what they actually end up doing can be two different things. To get a clear picture of the payoff on event spending, better measures than the physicians' words are needed*" (Vicciardo, 1995: 34). Otherwise, "*the validity of using stated prescribing as a measure of actual prescribing behaviour is questionable*" (Bradley, 1991: 283).

Furthermore, pharmaceutical manufacturers' promotional activities influence doctors' prescribing behaviour much more than most health professionals realise (Rougheadet al., 1998; Orlowski and Wateska, 1992; Pitt and Nel, 1988; Avorn et al., 1982). It may be due to the fact that medical practitioners perceive pharmaceutical promotion as less influential on their prescribing decisions than medical literature. For example, Pitt and Nel (1988) asked doctors what other factors influenced their prescribing

and the most common answer to this question was the medical and scientific literature. Avorn et al. (1982) also pointed out that doctors are reluctant to admit, and sometimes they are not aware of and deny the relative importance of pharmaceutical manufacturers' influence on their drug choice. That is, marketing is integral to a profit-driven industry that spends hundreds of millions of pounds to develop and promote a new drug (Wolfe, 1996). Pharmaceutical companies would not spend such massive amounts on promotion if it were not effective at influencing prescribing. And doctors do rely on it for information (Segal and Wang, 1999).

3.10.6 The Patient Scenario

To analyse drug choice, a written case scenario of a standardised patient has been chosen by most researchers for its methodological simplicity, and to exclude confusing variations in diagnoses (Chinburapa et al., 1993; Chinburapa and Larson, 1992; 1988; Mancuso and Rose, 1987; Segal and Hepler 1982; 1985; Lilja, 1976; Hemminki, 1975; Harrell and Bennett, 1974; Knapp and Oeltjen, 1972). Furthermore, a simulated patient case enables the researchers to experimentally control for the type and amount of information in the decision environment and to study the effects of selected independent variables on doctor clinical judgment and choice processes. Most studies typically summarise the hypothetical case scenario of patients with a single disease process, which requires rational

prescribing: "*researchers have attempted to create a situation in which, for a given patient, the most effective, least expensive, easiest to use, safest drug is the drug most frequently selected*" (Lambert et al., 1997: 1767). Recent evidence, however, indicates that prescribing practice is often inconsistent with criteria for safety and effectiveness (Anderson and Lexchin, 1996). That is, translating the recommendations of clinical guidelines and the findings from research studies into daily clinical practice remains a daunting challenge because there are marked differences between individual patients. As a result, the hypothetical case scenario does not represent most patients: "*The doctor, however, cares for individual patients who often differ in important ways from patients described in those hypothetical case scenarios*" (Pauker and Kassirer, 1987: 255). Other researchers also considered that the patient scenario described in their study was too general: "*Despite this attempt, the description did not represent several situations*" (Harrel and Bennet, 1974: 276).

As pointed out earlier, research in prescribing decision-making using *information processing* (*process tracing*) of final judgments paradigms have also used simulated patient cases to examine medical decision making (Chinburapa et al., 1993; Mancuso and Rose, 1987). However, Chinburapa et al. (1993) believe that the patient scenario may bias the findings because it gives a hypothetical solution to the problem under observation:

"*Another limitation concerns the use of a hypothetical case scenario and a well-structured decision task in which all available alternatives and relevant drug attributes were shown. This methodology may have provided subjects with part of the solution to the choice problems*" (ibid: 1481). In a similar vein, Bradley (1991) has noted, Segal and Hepler's (1982) study has obvious limitations "*which must make one remain cautious about accepting the model of drug choice proposed. Firstly, it based only on a hypothetical case. Secondly, it is possible that the questionnaire used actually encouraged doctors along a decision-making pathway that was not their usual one*" (ibid: 282).

The same methodological problem can be found in Chimburapa and Larson's (1988) study. These researchers, using the first part of a questionnaire, "*described a hypothetical case of a patient with essential hypertension. After reading the case, the respondents were asked to indicate the degree of importance of each of the five attributes (effectiveness, incidence of side effects, cost per day, dosage schedule, and acceptance by peers) in choosing an antihypertensive drug for the described patient*" (ibid: 9). However, the use of a hypothetical patient scenario in the questionnaire for eliciting instrumentality beliefs linking various drug choices and various outcomes *does not represent the respondent's cognitive structures and processes*. Furthermore, "*Many studies were not founded on actual clinical cases, but on simulated cases or questionnaires for which there was no evidence of validity or reliability*" (Eisenberg, 1979: 962).

On the other hand, the use of actual patient cases makes it difficult to control for a large number of attributes and information that may be presented or to compare results across doctors (Wigton, 1988).

Elstein et al. (1978) indicated two other limitations concerning the external validity associated with the use of simulated patient cases or written case presentation in medical decision-making research. First, hypothetical cases can only include certain variables; thus other important variables that may be crucial to the decision problem may be ignored. Examples of commonly ignored variables are concomitant diseases and gender. Second, the use of hypothetical cases may affect the responses given because doctors know they are being observed in the study. However, the main limitation concerns the findings obtained from simulated patient studies because the results may not be generalizable to actual patients or actual clinical environments in which decisions are less structured.

A final point to note here is that there is also evidence that the use of different patient scenarios with different diseases such as renal colic, hypertension, diabetes, or irritable bowel syndrome, may explain the equivocal findings reported in Epstein et al. (1984) and Denig et al.'s (1988) studies (Bradley, 1991). Denig et al. (1988) also suggested that the contradictory findings of some of the studies on drug choice may be explained by the diversity of patient scenarios that were used.

3.10.7 Theoretical Framework and Research Methods on Drug Choice

3.10.7.1 The Theoretical Framework

Although most studies of the factors that influence doctors' prescribing behaviour were helpful in identifying and highlighting some particular aspects of the therapeutic decision, they have tended to be largely descriptive: "***Many studies describing physicians' use of drug information sources are descriptive, thus limiting our understanding of why specific sources are utilized. In addition, these studies have lacked statistical rigor and a conceptual framework in which to guide the investigation***" (Gaither et al., 1996: 1291). In a similar vein, Hepler et al. (1981) argued that most drug adoption studies "***lack a unifying theory. Serious disagreements in the literature about what variables are actually correlated to adoption illustrate this problem. The studies tend to be descriptive and to follow the case-study approach***" (Hepler et al., 1981: 30). Although such work has been helpful in identifying problem areas, "***it has tended to be largely descriptive, raising more questions than it answers about the causes of the phenomena***" (Haaijer-Ruskamp and Hemminki, 1993: 101). Some models have, however, provided a more systematic conceptual approach, which was based on recognised theoretical frameworks. For example, some researchers argued that the theory of reasoned action was an extensively researched cognitive model that has proven successful in predicting and explaining behavioural intentions across a wide variety of domains (Segal and Hepler, 1985; 1982). In line with this reasoning, it is

possible to argue that during the 1970's and 1980's most of the research on doctors' prescribing behaviour was influenced by Fishbein's (1967), Fishbein and Ajzen's (1975), and Ajzen and Fishbein's (1980) theoretical frameworks. During the 1990's, however, this approach was questioned (Lambert et al., 1997). Therefore, two different periods of research on doctors' prescribing behaviour must be considered:

a) 1970's and 1980's

b) 1990's

In the first period, most studies on drug prescribing were based on the *expectancy-value theory*. In accordance with this theoretical framework, expectations about treatment outcomes and the value or desirability of those outcomes were evaluated:

"*All these studies directly or indirectly supported a view of* ***prescribing*** *as an active* ***problem-solving*** *process directed at achieving outcomes consciously foreseen by the prescriber*" (Denig et al., 1988: 1892).

All the researchers who used the TORA to explain drug choice assumed that doctors' prescribing behaviour was determined by sets of beliefs which are the cognitive component of attitude (Lambert et al., 1997).

In one set of beliefs, courses of actions were linked to consequences of those actions, and in another set, important social referents were linked to

reactions to these courses of action. *Attitudes* and *social values* towards prescribing behaviour were assigned to the decision-making process, and were assumed to be the main descriptors for doctors' prescribing behaviour. Behavioural intention was found to vary in accordance with the sum of the weighted motivations and the strengths of beliefs. In terms of methodological deficiencies, the traditional Fishbein and Ajzen (1975) summated model has been criticised for assuming that each belief-product makes an equal contribution to a simple uni-dimensional, or complex multi-dimensional, expectancy-value attitude (Foxall, 1984a;b;c; Mazis, 1984; Bagozzi, 1982). If this assumption is violated, sub-optimality is likely to be introduced into the measurement and prediction of attitude.

Since the early **1990's** there has been a growing concern about these assumptions (Lambert et al., 1997; Bagozzi, 1992). Furthermore, the low correlation that has been found between behaviour intention (BI) and behaviour (B) is also explained by methodological problems. The time lags between behaviour intention (BI) and behaviour (B) measures pose a very important methodological problem because accurate prediction of behaviour is only possible if intentions are stable. If this does not happen, the problem is overcome by measuring behaviour intention (BI) "***immediately prior to the observation of the behaviour***" (Ajzen and Fishbein 1980: 51).

However, the influence of manufacturers' promotional activities, such as representatives' calls, medical journal advertisements and conferences, or interaction with another colleagues might intervene between BI and B, and thus substantial brand switching may occur. Furthermore, prescribers are usually questioned directly about their beliefs or behaviours (or behavioural intentions). This raises the risk that doctors' attention may be directed to facts that they might not notice or outcomes that they might not consider during their daily clinical activity. Therefore, using Fishbein-type scales inconveniently introduces prior definitions of doctors' therapeutic cognitive structures. Besides these methodological deficiencies, the TORA and its extension do not explain how, or which type of, cognitive processes are responsible for the behaviour:

"***It leaves unanswered the question of how prescribers' values and beliefs are formed, how stable they are and how they change***" (Hepler et al., 1981: 39).

It has been shown that attitudes, subjective norms, and past behaviour can be used to predict doctors' intentions to prescribe different therapeutic categories (Segal and Hepler, 1982; 1985), but specific antecedents to decision-making in this context are generally unknown. An understanding of the antecedents (i.e., prescribers' clinical values) is, however, needed in order to more effectively influence the use of these therapeutic categories.

Almost three decades ago, Vinar et al. (1971) tried to validate these clinical values by looking into the pharmacologic and diagnostic patterns of a group of doctors. During the last decade, however, it has become increasingly clear that it is not possible to explain "***how the decision is made to include a therapy in the evoked set***" (Denig and Haaijer-Ruskamp, 1992: 12). Recent research was also unable to identify how prescribers' values and beliefs are formed (Lambert et al., 1997).

In accordance with the previous assumptions, it is possible to argue that the TORA (Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975) and its extension (Lambert et al., 1997) neither explains why certain values or beliefs become relevant in the context of a particular choice, nor explains how the motivations determining the impact of values or beliefs on behavioural intention come about. Ajzen and Fishbein (1980) argued that the characteristics of the choice situation will determine both which beliefs become salient and which motivations will determine behaviour. This assumption confirms that the process in which the individual analyses the situation and activates a subset of beliefs from his/her cognitive structure is not part of the theory (Grunert et al., 1995). Therefore, an important question remains unanswerable:

Why do doctors choose one therapeutic category over another, and what are the decision-making processes that underlie this choice?

3.10.7.2 Research Methods

Some researchers pointed out that most drug prescribing studies were not entirely satisfactory in providing an explanation of the methods that can be used to analyse decision making:

"*Another limitation of past studies of drug prescribing concerns the method used to study decision-making. Most previous drug prescribing studies have utilized an analysis of final judgment or decision output such as ranking or rating and employed statistical methods, mostly multiple regression, to test the fit of an algebraic model to data in order to infer that a physician used a particular process in decision making. However, relatively few studies directly observed or collect information regarding the actual process used by physicians in making drug choice* (Chinburapa et al., 1993: 1474).

In line with the reasoning that has been advanced, it is possible to identify *two major approaches* for understanding the cognitive processes underlying *medical problem solving* and *decision-making* (Elstein et al., 1978; Newell and Simon, 1972).

The first approach involves a *structural analysis of final judgment* or outcome of the decision processes such as choice, rankings, or ratings. This method typically employs statistical models (e.g., multiple regression, analysis of variance, etc.) to study the relationship between model **input** such as ***attributes*** or ***cues*** and **output** such as ***choice***.

The other approach, referred to as *process tracing*, stems from the information-processing approach to behaviour originated by Newell and Simon (1972). The information-processing theorists rely heavily on ***verbal reports*** to obtain data about the operations performed to solve a clinical problem. Because is based on analysis of these ***protocols***, the term *process tracing* has also been applied. However, research in the process-tracing tradition has been largely atheoretical, with the notable exception of the substantial contribution of Newell and Simon (Elstein et al., 1978).

In the following sections, each of the two approaches is discussed.

Structural Analysis of Final Judgment

Structural analysis of final judgment refers to methods that utilize decision outputs to study the decision-making processes. As previously noted, this approach employs algebraic or statistical methods to describe the relationship between input (attributes, cues) and output (judgment, choice) based on assumptions about how individuals use information to form judgment or decision (Abelson and Levi, 1985).

Generally, alternatives that are used to elicit judgment or decisions from subjects can be categorized into two types. The *first type* involves actual alternatives that are known to subjects or those subjects have had prior experience with.

The *other type* involves hypothetical alternatives (i.e., patient scenarios) that are described based on several attributes. The latter has been used in most studies on doctors' prescribing behaviour.

Some of these models were developed to predict and improve judgment. Through regression equations, researchers were able to "capture" decision-makers' policies regarding variables involved in a decision. In both approaches, subjects are presented with the alternatives and are asked to indicate an overall rating or preference for each alternative, the weight attached to each attribute, and for known alternatives, the beliefs or evaluations for each attribute. The scale values for attributes are put into mathematical equations based on hypothesized models to determine the goodness of fit or the relationship with the subjects overall rating or preference for alternatives.

As pointed out earlier, there are limitations associated with the use of algebraic models to study drug prescribing. This method uses the degree of fit of algebraic models to infer the decision-making processes and *does not directly observe or collect information about the actual processes used by decision makers*.

Process-Tracing Techniques

A number of strategies or rules describing the processes doctors used to make prescribing decisions have been identified in the literature in the last decade (see Chinburapa et al., 1993; Mancuso and Rose, 1987). These studies follow Elstein et al. (1978) and Newell and Simon's (1972) *information-processing theory of problem solving*. The methods used in these studies have also been in the spirit of their research approach: *verbalizations of doctors or medical students while solving medical problems* and subsequently reviewing their *clinical performance*. As Newell and Simon pointed out, only the full complexity of verbal behaviour, as captured in a *verbatim transcript*, can do justice to the complexity of the *medical knowledge representation.*

Process-tracing techniques are data collection methods that trace the information acquisition (Newell and Simon, 1972). Although collecting and analysing the data using the process-tracing technique is time consuming, this technique collects the data on pre-decisional behaviour to identify what information attended to and how the information is processed before the decision is made (Chinburapa et al., 1993). The process-tracing approach was found particularly sensitive to the natural control structure of the subject's problem-solving method (Kuipers et al., 1988). In other words, process-tracing techniques are data collection methods that are

particularly suitable for understanding information acquisition. With this qualitative approach, their efforts were clearly directed at development of an information-processing model, which is practically nonmathematical. Newell and Simon explicity pointed out that their theory of human problem solving was intentionally nonexperimental and nonstatistical. Thus, with a process-tracing technique, the researcher can usually conclude that the information reported was actually in the subject's focus of attention at the time but of course much of what the subject had in mind necessarily goes unreported (Newell and Simon, 1972). This is problematic because process-tracing data focus mainly on path-breaking to identify presenting problems, gather background information and form and test clinical hypotheses. The major concern of researchers in most process-tracing investigations we have just summarized has not been to develop prescribing decision-making theory. Rather, their aim has been to observe the process of thinking and judgment within clinical settings that resemble the actual task environment as closely as possible:

"*The focus of the study is largely on the processes of diagnostic reasoning, although questions of treatment selection and management are also addressed*" (Elstein, 1978: 273).

Thus, **information acquisition** on the processes of diagnostic reasoning is assumed particularly relevant on doctors' decision-making processes.

The *process-tracing technique* employed in Chinburapa et al.'s (1993) study was an analysis of **information acquisition behaviour** to examine the effects of situational involvement and task complexity on doctors' pre-decisional behaviour: "*The method collects the data on pre-decisional behavior to identify what information is attended to and how the information is processed before the decision is made*" (ibid: 1474). Chinburapa and colleagues found that the process-tracing technique used in their study was able to obtain objective and useful data regarding doctor information acquisition behaviour prior to making prescribing decisions. A software system was used to monitor information acquisition behaviour. Computer graphics were used to display a set of drug classes in a form of alternative-by-attribute matrix:

"*On a display screen, each column represents a drug alternative while each row represents a drug attribute across all alternatives presented. Each cell contains the value of an attribute for the alternative that forms the cell. The values for alternatives and attributes in the matrix are hidden behind the blank boxes*" (ibid: 1475).

Besides the use of both a hypothetical case scenario (an acute uncomplicated urinary tract infection) and hypothetical anti-infective drugs, this methodology has a strong limitation as Chinburapa and colleagues recognised:

"*a well structured decision task in which all available alternatives and relevant drug attributes were shown. This methodology may have provided subjects with part of the solution to the choice problems*" (ibid: 1481).

Nevertheless, Chinburapa et al.'s (1993) study on doctors' prescribing behaviour was the first study to use a ***qualitative technique*** (i.e., process-tracing) followed by a ***quantitative analysis*** (the analysis of final judgment technique used in this research was conjoint analysis). This is critical for future research on doctors' prescribing behaviour because a ***multimethod approach*** is suggested for the first time: "*the finding that the linear model performed well in predicting drug choice even though the process-tracing technique indicated that subjects used a noncompensatory decision-making process demonstrates that a single model of studying decision-making is not sufficient if the researcher's goal is to understand the process underlying decision making. A* ***multimethod approach*** *should be used to study decision-making process. The use of combination of methods enable researchers to gain insights into how decision-making processes and choice are affected by decision contexts.*" (ibid: 1481).

Mancuso and Rose (1987) recognised that "*Medical problems differ from many others traditionally used by psychologists to study problem solving, in that all the information needed to solve the medical problem is typically unavailable at the start*" (Elstein et al., 1978: 277). Nevertheless, Mancuso and Rose explored doctors' cognitive processes with "*a method used by cognitive psychologists in which the problem-solving strategy is characterized from verbalizations during each step in the decision-making process*" (ibid: 1281). The interviewer intervenes only with non-directive reminders to keep thinking aloud.

3.10.8 Medical Cues, Focal Points and Clinical Values

Mancuso and Rose's ***focal composite analysis*** designed the interview as a 'thinking aloud' experiment, in which the doctor is asked to report as much as possible of what (s)he thinks about as (s)he solves a clinical problem. From verbalizations during each step in the decision-making process, only a few clinical *focal points* or pertinent facts are obtained. This is also suggested by other researchers: "*Among the skills necessary for the practice of clinical medicine are the abilities to collect the pertinent facts about a case and to use these facts intelligently in order to arrive at an appropriate diagnosis*" (Elstein et al., 1978: 252). Thus, it is possible to assume a ***focal point*** as a psychological tool to manage an enormous amount of clinical information (Mancuso and Rose, 1987).

Similar to medical/clinical problem solving (Elstein et al., 1978), the ***focal composite model*** makes explicit that: "*focal points are valued, compared with each other, and are the elements of the case around which individual decisions are made*" (Mancuso and Rose, 1987: 1284). However, this approach suggests that doctors do not use the hypothetic-deductive method in arriving at therapeutic decisions: "*They were not seen to generate hypotheses regarding optimal treatment nor did they search the case for further data to support treatment choices*" (ibid: 1284). Rather, doctors were found to be guided by their own set of *heuristics* from which they make explicit the clinical facts (i.e., *focal points*) selected and the values placed on them.

Nevertheless, Mancuso and Rose recognised that: "*The final choice could be predicted solely by consideration of unweighted cues*" (ibid: 1284). Again, **cues** acquisition (i.e., ***focal points*** or ***personal clinical values*** in Mancuso and Rose's terminology) represents one of the methods proposed by Elstein and colleagues for understanding clinical problem solving: "*Cue acquisition refers to the process of collecting data in clinical problem solving...Effective cue acquisition proceeds according to a plan that permits and facilitates selective data acquisition*" (ibid: 277) ... "*Possible solutions to a diagnostic problem are retrieved from a physician's long-term memory store via an associative process that links cues to content stored in memory* (ibid: 278).

Because drug prescribing decisions must often be made without a "state-of-the-art" standard, it is possible to argue that the *focal composite method* incorporates doctors' ***personal values*** in the decision-making process:

"*In the focal composite method, such value judgments are expressed through the choice of focal points and the importance placed on them. In addition, the model allows the physician's* ***personal values*** *and assessments of clinical information to be integrated. Thus, the art of making a therapeutic decision has embedded within it many small judgments, from those based on clinical science to those based on* ***personal values***" (Mancuso and Rose, 1987: 1284).

In summary, "*The choice of method appears to depend more on the structure of the particular problem than on stylistic differences among physicians*" (Elstein et al., 1978: 278).

3.11 Main Conclusions

Prescribing is one of the most important roles of a GP. In fact, it is the most common therapeutic approach taken when treating patients in primary care and the number and potency of medicines available is increasing all the time. However, many GPs are reluctant to acknowledge that drug marketing affects the way they practice medicine. That is, the medical profession is exposed to many influences from outside their home market through, for example, international guidelines, advertising in international medical journals, conferences and other events. However, local factors, senior peers and the influence these have during a GP's traineeship play an important role in determining prescribing habits. Once they are established, however, the decision to prescribe and what to prescribe is influenced by several other national and regional factors:

- recent knowledge acquired about drug treatment through the pharmaceutical manufacturers' promotion, through the medical scientific literature, or more recently in Britain, as well as in other European countries, through advice from the medical and pharmaceutical advisers of the family health service authorities;
- each patient's lifestyle and background; and
- individual preference interacting with knowledge obtained from

different sources of drug information.

In view of this, it is important to gain understanding of the backgrounds of prescribers' therapeutic decision making. Two approaches have been used at the prescriber's level:

- studies evaluating interventions aimed at improving drug choice; and
- studies explaining this prescribing behaviour.

The former, however, show conflicting results. The second type of studies offers a further explanation. By building on the work of these researchers, together with concepts of *patient typology* and *medical guidelines*, we find it possible and desirable to develop a new taxonomy of clinical values useful for research and pharmaceutical marketing practice on drug choice. Understanding why specific prescribing behaviour prevails may clarify why some intervention and marketing programmes fail.

In the drug choice process two steps were identified: firstly, the generation of a small set of possible treatment options (i.e., an "evoked set") and, secondly, the selection of a specific therapy for an individual patient. Whether a specific therapeutic category or drug will become part of a GP's evoked set depends on the education and information received. Changes will occur when a new therapy is adopted by the GP. When introducing a new pharmaceutical class, several effects are aimed at. Firstly, the need for a new product is stressed. This need can be encouraged by campaigns that bring certain diseases or

issues to the attention of the prescribers and patients. Secondly, doctors are familiarized with the brand name by advertisements and mailings. Thirdly, a positive brand attitude is created by building a good corporate image and by providing objective positive information about the new product or drug class. The latter is achieved by collaborating with independent research institutes, and supporting and organizing meetings with a neutral outlook (i.e., meetings focusing on a disease or a drug class rather than on one specific product). Finally, the intention to prescribe the product is stimulated by offering GPs acceptable reasons for introducing the new therapeutic category/brand or by proving doctors with a chance to see for themselves (e.g., a seeding trial).

To explain the prescribing decisions of GPs, researchers often employ a model or representation of the mental events and feelings of decision-makers. In most of the models, researchers assume that action is initiated with a processing of information, followed by an evaluation of the information and the development of an attitude, and ending with the emergence of a intention to act prior to performance of a particular behaviour. However, having reviewed prescribing studies, one central question remains to be answered:

What are the clinical values derived from subsets of doctors' cognitive structures that become behaviourally relevant to drug choice?

Based on the analysis to evaluate the described models it is possible to conclude that ***it is necessary to build and develop a new model***:

"*Most models not only ignore the effect of a number of important variables but also fail to consider the interactions between the variables. In addition, few of these models specify the relationships among the variables so as to facilitate the testing of these models in some quantitative fashion...From the review and evaluation of the new drug adoption models in the pharmaceutical literature, one can conclude that none of the models are entirely satisfactory in providing a systematic and verifiable explanation of the process by which physicians adopt new drugs*" (Agrawal and Calantone, 1995: 107-108). This difficulty appears to be related not only to the ***theoretical framework*** chosen to study prescribing decisions, but also to the ***research methods***.

Mancuso and Rose's model embraces ***cues***, ***focal points*** and ***personal clinical values*** as interchangeable concepts with the same meaning. Thus, *the role of personal values as standard or criterion for influencing evaluations or choices regarding pharmaceutical products suggests a strong relationship between clinical values and therapeutic decisions*. In line with this reasoning, it is also clear that *prescribing decision making in primary care is strongly influenced by clinical values. These would have to be taken into consideration in any study of drug choice in general practice.*

4 Chapter Four Means-End Chain Theory and Laddering Technique

4.1 Introduction

As pointed out in Chapter Two, *GPs' clinical values in the treatment of hypertension* and *philosophies of prescribing* (i.e., medical guidelines) are two main dimensions of substantive research interest. These dimensions represent a substantive area of research and a new route to fill a gap within the literature on doctors' prescribing behaviour. Furthermore, this line of inquiry distinguishes the present study from previous research. As a result, the purpose of this chapter is to outline the theoretical/ conceptual basis of the study. The chapter will be organised in five parts:

- The first part of the chapter will be used for establishing the major differences between the present study and previous research, followed by an introduction to the research methodologies.
- Part two describes the Laddering Technique (Reynolds and Gutman, 1988). The importance of an ***Implication Matrix*** to the development of an ***Hierarchical Value Map*** is also presented in part two.
- Part three discusses the epistemological location of ***Means-End Chains (MEC) Theory*** (Gutman, 1982), based on its roots and its contribution to other theoretical approaches on consumer behaviour. Part two ends with the definition of MEC theoretical framework objectives.

- The fourth part of the chapter presents the operationalisation of the part two by describing a newly available algorithm to make the data analysis (***LadderMap***) (Gengler and Reynolds, 1995). An overview of the stages the researcher must go through, the important considerations at each stage, and how these stages of computer analysis of Means-End data can be facilitated using this software support tool are also presented.

- Some recent examples of the use of MEC theoretical framework and its laddering approach are advanced in the fifth part of the chapter.

- A final issue with respect to MEC theoretical framework and Laddering methodology concerns the impact of clinical values on drug choice. The objective of the last part of the chapter is to clearly define the nature of the values as conceptualised and measured by the researcher; comparing this with alternative approaches. A micro research approach is defined and its abstraction levels presented. Finally, the chapter highlights the need to examine the implications derived from the researcher's values conceptualisation and its influence on the interpretation of results.

4.2 Major Differences from Previous Research

In attempting to understand how doctors define their prescribing behaviour, pharmaceutical marketing[1] researchers have concentrated their efforts on GPs' attitudes, subjective norms and intentions towards brand attributes. Until now, studies on prescribing behaviour have relied upon the discovery of patterns of cause and effect in order to advance the knowledge of which pharmaceutical brand attributes influence drug choice. *This study proposes a new theoretical framework and a different research methodology to explain what values are derived from subsets of doctors' cognitive structures that become relevant to drug choice:*

"***For some medical decisions, values and attitudes of physicians on how much risk is acceptable or what levels of certainty are required for action can have a substantial influence on what tests are ordered or which treatment is recommended*** (Billings and Eddy, 1987: 23). That is, "***The concept of 'value' replaces the traditional concept of 'product'*** (Boerkamp et al., 1992: 147). Because of the scarcity of the research on this topic, the Means-End Chain theoretical framework (Gutman, 1982) and its laddering procedure (Reynolds and Gutman, 1988) was initially used.

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[1] "***Pharmaceutical marketing, as a subspecialty of marketing, can be defined as a process by which the market for pharmaceutical care is actualized***" (Smith, 1991a: 9).

Therefore, one of the novel features of the present research lies in the use of a ***different theoretical and empirical approach*** to that employed previously.

Assuming that a GP's therapeutic approach is based on ***clinical values***, considerable effort will be devoted to the construction of different hypertensive ***patient typologies***. Segal and Hepler (1985) also suggested that doctors' prescribing behaviour changes in accordance with the patient's clinical context:

"***The results show, however, that these prescribers changed their beliefs about treatment effects from patient to patient frequently***" (Segal and Hepler, 1985: 974).

Therefore, in the present research, *all the hypertensive patient typologies will defined by Portuguese GPs in accordance with their daily clinical activity*. In this way, the therapeutic categories attached to those hypertensive patient typologies will be used *to categorise Portuguese GPs according to their first-line drug therapy* (see Chapter Two: ***Figure 2.2: Study Overview***). This is also other ***major difference*** from previous research which defined a "patient scenario" to analyse drug choice. As a result, *the approach to this research differs from those studies which believe that the expectancy-value theory can explain GPs' prescribing behaviour*.

This conviction was reinforced recently by researchers who analysed the factors associated with antibiotic prescribing:

"*physicians' attitudes, subjective norms and intentions were not predictive of actual antibiotic prescribing behaviour. Prescribing behaviour may have been a function of* ***patient-specific*** *rather than general beliefs about antibiotics*" (Lambert et al., 1997: 1767).

That is, there is mounting evidence that *prescribing is patient-oriented rather than product-oriented* and follows medical guidelines (Pathman et al., 1996), which are an important tool concerning the promotion of the rational use of medicines in Portugal (Andrade, 2000).

It is, therefore, not surprising, that "*Research on clinical guidelines and effectiveness is being undertaken to provide physicians and others with information to assist in determining the type of care that should be rendered to a particular patient*" (Kay, 1990: 143).

Having said this, it should be added that this study follows not only medical education guidelines (Schachter, 1997; Birkenhager, 1996; Beevers and MacGregor, 1995; Kaplan, 1994; Hart, 1993; Houston, 1992), but also recent practical guidelines for the management of hypertension (WHO-ISO, 1999; 1993; JNC VI, 1997; Veterans Health Administration, 1996; WHO, 1996).

The use of simulated patient[2] scenarios on medical training was also found important to understand drug choice (Roberts et al., 1995; Baerheim and Malterud, 1995). The emphasis on the relationship between therapeutic classes and patient typologies reinforces the importance of terminal values[3] rather than instrumental values:

"*terminal values determine choice at the product class level but instrumental values at the brand choice level*" (Howard, 1989: 58).

Previous research focused on instrumental values at the brand choice level. To the best of our knowledge, *there is no previous research that has defined GPs' terminal values towards first-line drug therapy*. This is the ***third major difference*** from past published research on doctors' prescribing behaviour.

The ***fourth major difference*** from past published research on drug choice is attached to *research design* which encapsulates both *qualitative* and *quantitative* data.

[2] Simulated patients are role-players who pretend to be patients for medical students or doctors for teaching, assessment or research purposes (Baerheim and Malterud, 1995: 410).
[3] Howard (1989) defined a two-level choice structure in which terminal values operate at the higher level (i.e., product class) and instrumental at the lower level (i.e., brand).

4.3 Formulation of Research Design and Instruments

Following Chisnall's (1992) advice, this study uses both **qualitative** and **quantitative** data:

"*A central part of research activity is to develop an effective research strategy or design. This will detail the most suitable methods of investigation, the nature of the research instruments, the sampling plan, and the types of data, i.e., quantitative or qualitative (or, ideally, both)*" (Chisnall, 1992: 23).

Other researchers have provided evidence showing that "*Qualitative research is used for exploratory studies leading into more structured or quantitative studies*" (Hakim, 1987: 26). Surprisingly, no studies could be found applying both methods to doctors' prescribing behaviour.

The variety of clinical contexts, the complexity of the problem and the interdependence of influencing factors on doctors' prescribing behaviour call for a diversity of conceptual approaches.

Basically, two major methodological schools of thought can be distinguished: ***qualitative*** and ***quantitative*** (Gillett, 1995; Gabriel, 1990). The former uses the participant observation, protocol studies or in-depth, open-ended interviewing methods of data collection, while the latter is intended to test hypotheses, generally relating to the causes of a particular phenomena through a questionnaire (Henwood and Pidgeon, 1995).

Gill and Johnson (1991) suggest that *qualitative data* tend to be associated with *inductive reasoning*, while *quantitative data* tend to be associated with empiricist, positivist methods employing *deductive reasoning* and *testing of hypothesis* (see *Table 4.1* below).

For the reasons discussed above, research methods can be placed on a continuum according to the type of reasoning they employ between *nomothetic methods* at one end and *ideographic methods* at the other.

Table 4.1: Comparison of Nomothetic and Ideographic Methods

Nomothetic Methods Emphasise		Ideographic Methods Emphasise
1. Deduction;	**vs**	**Induction;**
2. Explanation via analysis of causal relationships and explanation by covering-laws;	**vs**	**Explanation of subjective meaning systems and explanation by understanding;**
3. Generation and use of quantitative data;	**vs**	**Generation and use of qualitative data;**
4. Use of various controls, physical or statistical, so as to allow the testing of hypotheses; and	**vs**	**Commitment to research in everyday settings, to allow access to, and minimise reactivity among the subjects of research; and**
5. Highly structured research methodology to ensure replicability of 1, 2, 3, 4.	**vs**	**Minimum structure to ensure 2, 3 and 4 (and as a result of 1)**
Laboratory Experiments, Quasi Experiments, Surveys, Action Research, Ethnography.		

Source: replicated from Gill and Johnson (1991), pp: 36.

As Gill and Johnson (1991) have noted, the choice of research strategy, design and method is subject to a number of influences, philosophical, social, political and practical. However, the intimate connection between *patient typology* and *drug choice* that has been established within the medical field, particularly antihypertensive medical guidelines, gives priority to practical considerations. This reality suggests that there are links between therapeutic categories (the 'means') and the consequences these provide for the doctor in terms of therapeutic results, dependent on the personal clinical values of that individual (the 'ends'). It is these ***end values***, rarely consciously considered, that play a major part in determining the doctor's prescribing behaviour.

The in-depth laddering interview elicits these personal motivations by encouraging respondents to revisit everyday, common place experiences and to examine the assumptions and desires driving seemingly simple choice behaviour.

In light of these assumptions, it became mandatory for us to use the in-depth laddering interview (see *section 4.6*) as the most appropriate technique for understanding how these ***clinical values*** determine drug choice (see *Decision Box 4.1* below).

Decision Box 4.1: *Formulation of Research Design and Instruments*

- ***Focus:*** *The Relationship between Patient Typology and Drug Choice*
- ***Theoretical Approach:*** *Means-End Chain (MEC) approach and Laddering technique* ***(see this Chapter for specific details)***
- ***Design:*** *In-Depth Interviews* ***(see Chapter Five for specific details)***
- ***Data type:*** *Semi-Qualitative*
- ***Interpretation:*** *Inductive, theory based analysis and reasoning*
- ***Goal:*** *To develop "The Patient Typology Model"* ***(see Chapter Six for specific details)***

In some quantitative research, hypothetical case histories have been used to analyse prescribing whereby the same case is presented to a series of doctors and their views as to how they would prescribe for the patient in question are recorded. One advantage of this method is that the case can be purposefully constructed and each doctor is confronted with precisely the same test situation. However, this approach has also one crucial

disadvantage: it uses hypothetical case histories. To overcome this problem, both the *qualitative* and *quantitative* approaches were used in this research (see *Decision Boxes 4.1 and 4.2*). With the methodology employed we were not creating hypothetical case histories. Instead, we retrieved from GPs real cognitive excerpts in terms of the hypertensive typologies that guide their first-line drug therapy (see Chapter Five).

These data were used to develop "***The Patient Typology Model (PTM)***" (see Chapter Six) which involves the use of numeric data (see Chapter Seven).

Decision Box 4.2: *Formulation of Research Design and Instruments*

- ***Focus:*** *Modelling and Categorisation of Portuguese GPs' Prescribing Behaviour: The Case of Patients with Hypertension*
- ***Theoretical Approach:*** *Cognitive approach*
- ***Design:*** *Positivistic, structured research design* ***(see Chapter VII for specific details)***
- ***Data type:*** *Quantitative*
- ***Interpretation:*** *Deductive*
- ***Goal:*** *To categorise Portuguese GPs according to their first-line drug therapy* ***(see Chapter VIII for specific details)***

4.4 The Means-End Chain (MEC) Theory

Over the last decades there has been a growth of interest in the philosophy of science to guide marketing theory and research (Brown, 1996; Gillett, 1995; Hunt 1993; 1992; 1983; Peter, 1992; Bagozzi, 1984; Deshpande, 1983). The ontological, epistemological, and methodological guidelines for doing research have important consequences for the official ideology and discourse through which the "facts" are constructed. However, "*despite advancing sophistication in the philosophy of science, the methodological debates have proceeded for the most part separately from the empirical investigation of marketing phenomena or the development of marketing theory*" (Foxall, 1993: 46). The dearth of theoretical frameworks to guide empirical investigations has led to difficulties when linking marketing research and subsequent marketing strategy (Reynolds and Craddock, 1988):

"*Traditional marketing research does not have a framework by which the understanding gained can be either (1) directly assessed for the development of strategic options or can be (2) specified in a consumer-based strategy format. The result of not having such a consumer-based strategy framework is undue subjectivity in the translation process of research findings underlying the development of advertising strategy*" (Reynolds and Craddock, 1988: 53).

The vehemence with which Reynolds and Craddock made this point can be found elsewhere in previous criticisms of the lack of correct methodologies linking theoretical frameworks to empirical approaches.

Foxall (1986), for example, pointed out that it is important to have: "*a frame of metatheoretical reference within which theory is derived, by which empirical investigation is governed, and through which theory and observation are related in the process of explanation*" (Foxall, 1986: 28, 29). This assumption reinforces the acceptance of the theory-laden nature of observation: "*rather than a data-driven process, science is being described more and more as a theory-driven activity*" (Bagozzi, 1984: 18).

The close relationship between theoretical assumptions and research approaches is suggested to be an indirect consequence of the paradigm that has been chosen, because it influences the way we move from the language of theory (concepts) to the language of research (indicators). As a result, the chosen paradigm and the theoretical framework within which the empirical research is produced is important for understanding of the final results. It follows from the previous paradigmatic principles that to initiate a research process a theoretical framework has to be established (Bryman and Cramer, 1997). A recent theoretical framework, ***the means-end chain analysis*** and its ***laddering method*** "***are one of the most promising developments in consumer research within the last decade***" (Grunert et al., 1995a: 1).

The MEC Theory (Gutman, 1982; Olson and Reynolds, 1983) presents a model to assess consumers' product knowledge and meaning structures.

Previous research using the MEC approach, seems to indicate that this ***micro-psychological*** theoretical framework offers a practical metaphor to assess the way consumption-relevant knowledge is stored and organised in human memory: "***means-end models can be more broadly viewed as representing the relationship between self and products, where the means represent aspects of product knowledge, and the ends represent aspects of consumer self-knowledge***" (Walker and Olson, 1991: 112). This practical metaphor is able to link the product and self by capturing the representation of cognitive structures in memory (Claeys et al, 1995). Thus, the central tenet of MEC theory is that product, service or behaviour meaning structures stored in memory consist of a chain of hierarchically-related elements (Gutman, 1982). This linear, hierarchical structure and network context forms a "means-end chain" in that ***attributes*** are the means by which the product, service or behaviour provides the desired ***consequences*** or ***values***, i.e. the ***ends***. As a result, ***values*** (which derive from a specific culture, society, or personality) are the ultimate source of choice criteria that drive buying behaviour (Clayes et al., 1995).

Consumers translate product attributes into the benefits (termed consequences) they produce, and benefits are ultimately translated into the consumer's driving value orientation. These values are consumers' mental representations of the important **end states** they are trying to achieve in

their lives. Durgee et al. (1996) pointed out that values impact attitudes, which in turn impact behaviour. Two types of values were identified: *instrumental* and *terminal values* (Walker and Olson, 1991: 113). The former represents a "*preferred mode of conduct ... a preferred pattern of behaviour*", while the latter "***represent preferred end states of being***" (Peter and Olson, 1987: 112). By definition, *instrumental values* represent the less abstract knowledge which affect the consumer's cognitions and behaviours in accordance to "*self-schema that may be activated in different situations*" (Walker and Olson, 1991: 113).

The intimate connection between products and self that has been established within the MEC framework determines the two fundamental assumptions about consumer behaviour that are advanced in the means-end chain model:

1. "that ***values***, defined here as desirable ***end-states of existence***, play a dominant role in guiding choice patterns; and
2. that people cope with the tremendous diversity of products that are potential satisfiers of their ***values*** by grouping them into sets or classes so as to reduce the complexity of choice" (Gutman's 1982: 60).

What seems to emerge from these fundamental assumptions is that in addition to the product-class type of product categories, consumers have

the capacity to organise categories based on product functions, in order to organise "***the linkages between the product and the personally relevant role it has in the life of the consumer***" (Reynolds and Gutman, 1988: 11). That is, because of the multiplicity of a product's ***attributes***, consumers are selective about which ***attributes*** are most meaningful to them. The reason for such selection is the limited capacity of the human cognitive processing[4] system (Alba and Hutchinson, 1987). Hence, the meaning of a product to a consumer is based on selected product ***attributes***, which are important for organising categories based on product functions. Two other general assumptions complement the previous ones:

1. consumer actions have ***consequences***; and
2. consumers learn to associate particular ***consequences*** with particular actions.

Consistent with these considerations, product meaning becomes a consumer's cognitive and affective representation of a product (Valette-Florence and Rapachi, 1991). The product in turn has ***attributes*** that are important for obtaining the desired benefits (***consequences***), through which certain ***ends*** or ***valued states of being*** are satisfied. Therefore, the

[4]Cognitive processes are the processes by which the cognitive structures are changed due to new information from the environment, and by which information is retrieved from the cognitive structures and used to direct behaviour.

first element of the chain subsumes the product knowledge component. Attributes in turn determine a set of ***consequences*** and benefits[5], that are evaluated by consumer personal ***values***. This sequence of links from the product attributes to consumer values, forms a "means-end chain" in that ***attributes*** can be faced as the ***means*** by which the product provides the desired ***consequences*** and ***values***, the ***ends***.

The interest in cognitive structure approaches to determine the linear hierarchical structure and network context[6] that links ***means*** to ***ends***, has given researchers the opportunity to study motivational issues in general (Sorensen et al., 1996; Claeys et al, 1995; Olson, 1995; Grunert and Grunert, 1995a;b; Celsi and Olson, 1988) or consumers' goals and their hierarchical structure in particular (Bagozzi and Edwards, 1998; Olson, 1995; Pieters and al., 1995; Bagozzi and Dabholkar, 1994; Huffman and Houston, 1993). For example, Bagozzi and Dabholkar (1994), in an attempt to improve the Theory of Reasoned Action (Ajzen and Fishbein, 1980) to explain recycling behaviour, have used a means-end approach and its laddering procedure to capture excerpts from cognitive structure that could explain recycling goals.

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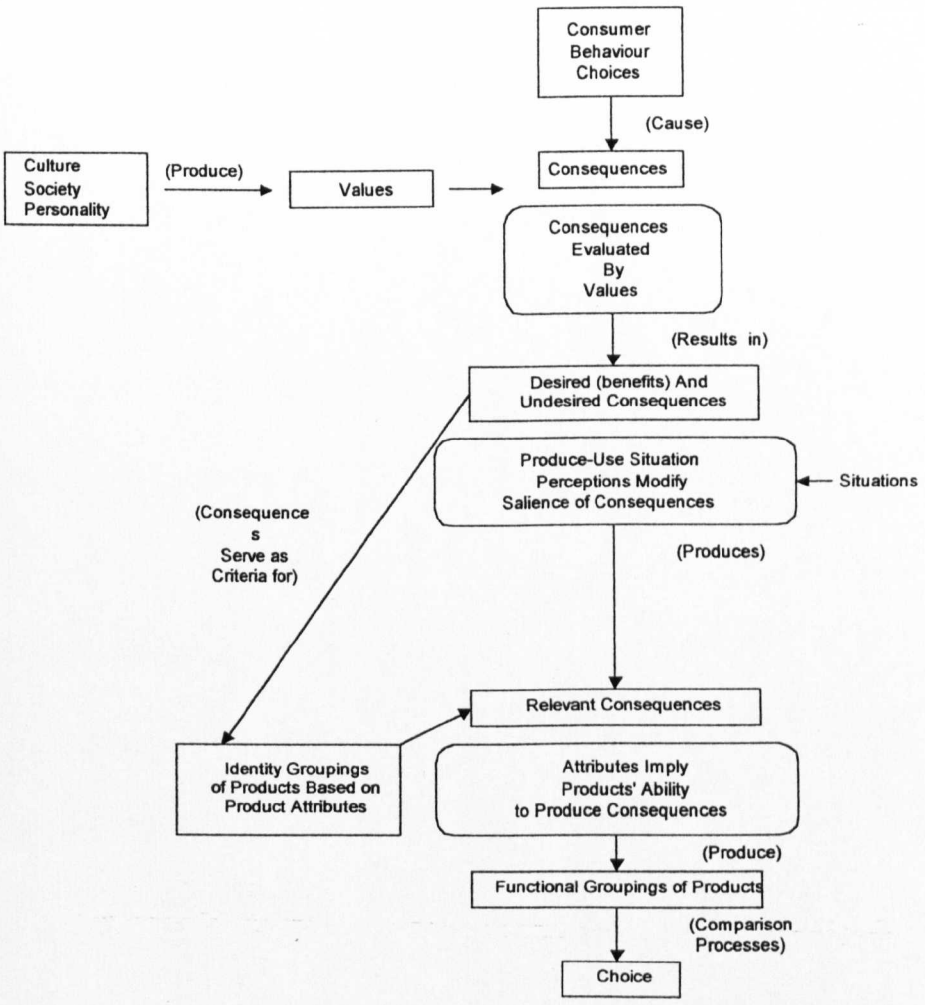
[5]Benefits differ from attributes in that people receive benefits whereas products have attributes.
[6]The literature on cognitive psychology is replete with models of cognitive structure. Most of them are variants of a basic network model. However, there are alternatives to network models: schemas, frames and scripts are some of the non-network constructs that have been used to model cognitive structures.

Typically, these researchers have tended to represent mental models that derive from content analysis in a range of areas which vary from, for example, the regulation of body weight and recycling (Bagozzi and Edwards, 1998; Bagozzi and Dabholkar, 1994 respectively), to fish consumption (Sorensen et al., 1996).

In looking at differences between ***means*** and ***ends*** to achieve goal-directed consumer behaviour in terms of a ***Means-End*** hierarchical structure, researchers are able to determine the product functions (i.e., main ***attributes*** of a product-class type of product categories), the direct ***consequences*** that their use implies, and the ***values*** attached to consumer behaviour: "***More recent work links values and products together via "means-ends" chains. Most of these begin by asking about important product attributes as perceived by respondents, then probing until the researcher identifies more general motives or values regarding the product***" (Durgee et al., 1996: 91). Consistent with this reasoning, it seems reasonable to expect that the MEC model (Gutman, 1982) gives researchers the opportunity to understand deeply the ***values-consequences-attributes*** linkages derived from a product-use situation. To summarise, the model may be conceptualised as shown in Figure 4.1.

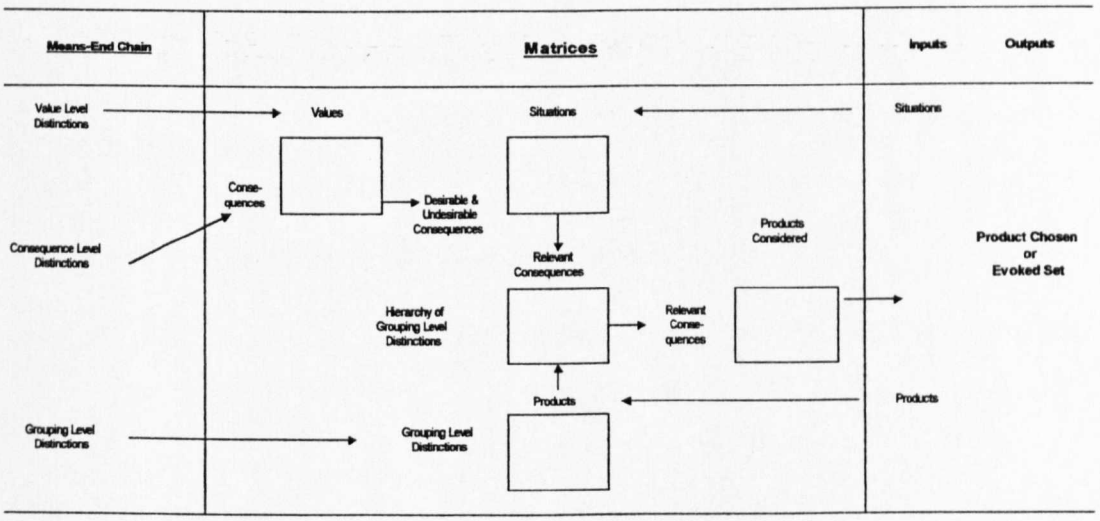
Figure 4.1: The *values-consequences-attributes* Linkages



It is the associational aspects of the Means-End model that provides a unique perspective on consumers' personally relevant meaning, because its framework is able to encompass all three levels of consumers' decision-making. That is, ***attributes***, ***consequences*** and ***values*** are the linear hierarchical structure and network context to link means to ends.

The Means-End-Chain model presents three main parts: ***the means-end chain***, ***matrices*** and ***inputs*** and ***outputs***. According to the Figure 4.2, the means-end chain subsumes three different levels of distinctions - values, consequences and grouping. Higher hierarchical concepts focus on what products are supposed to do for the consumer, while the grouping level concentrates on distinctions that can be made according to the product attributes. The "Inputs" to the framework are mainly consumption situations and products; "Outputs" are products chosen for final consideration. The matrices are the structure within the system through which situations and products are categorised according to the hierarchical levels represented in the means-end chain.

Figure 4.2: The Means-End Chain Model (MEC)



A Means-End Chain Model Based on Consumer Categorization Processes

Source: Adapted from Gutman (1982)

4.5 The MEC Theory and its Epistemological Location

The last decade has seen an increasing interest in cognitive structure[7] approaches for studying consumer motivation and choice behaviour. Means-End Chain (MEC) Theory (Reynolds and Gutman, 1984; Olson and Reynolds, 1983; Gutman, 1982) has been the basis of much of this work. This theoretical framework and its laddering technique have been considered useful tools for understanding personal relevance and consumer decision-making. As such, use of MEC theory and its laddering technique in consumer research have been viewed as "***one of the most promising developments in consumer research within the last decade***" (Grunert et al 1995a: 1).

A discussion of any theory is only possible when its epistemological location has already been defined. For some researchers, this is not the case with MEC:

"***A discussion of means-end chain theory is made difficult by the fact that the epistemological status of means-end chains (MEC) is not completely clear***" (Grunert et al., 1995a: 1).

[7]A cognitive structure is the organization of experience and other types of information in human memory. "In consumer research, cognitive structure has generally referred to factual knowledge (i.e., beliefs) that consumers have about products and the ways in which that knowledge is organized. The principal function of cognitive structure is to differentiate various products and services in ways that are useful for decision-making" (Alba and Hutchinson, 1987: 414).

The epistemological location of MEC theory is controversial. Various research traditions, "***ranging from an interpretivist phenomenological view to a neo-positivist nomological view***" (Grunert et al 1995a: 1) claim its interest. Two basic views are identified: the ***motivational*** and the ***cognitive*** as important sources of reflection for the development of MEC. Not only these roots, but also the contribution of MEC theory to other theoretical approaches on consumer behaviour, have generated some misinterpretation about its epistemological location. Having said this, it should be added that there is also evidence that this misinterpretation is only possible if one forgets that the hierarchical value map derived from laddering data is an aggregate map of cognitive structure (Olson and Reynolds, 1983). Any other scientific explanation of the use of MEC theory in consumer research that "***adopts a phenomenological view that all measurements are context-dependent, the notion of measuring a situation-invariant cognitive structure does not make much sense***" (Grunert and Grunert, 1995: 210). As a result, a discussion of the epistemological location of MEC Theory has to be organised. This discussion illustrates further the relevance of an understanding of the epistemological location of MEC Theory in terms of its roots and contribution to other theoretical approaches to consumer behaviour.

4.5.1 The Roots

Gengler et al. (1995a) argued that the roots of Means-End Chain Theory and its Laddering methodology is derived from Kelly's (1955) original *Personal Construct Psychology*. That is, the representation of cognitive structures in memory advocated by the MEC theory are identical to the *Personal Construct Psychology* of Kelly (1955) in the sense that both are based on the acknowledgement that product, service or behaviour may be linked to self. What seems to emerge is that the roots of MEC theory are closed related to the "person-as-scientist" metaphor: "*Like Personal Construct Psychology, Means-End Theory assumes that the meaning is both in the words that consumers use to describe their world, and in the connections between different concepts*" (Gengler et al., 1995a: 254).

Through personal experimentation, individuals develop personal constructs[8]. Following this assumption, it can be seen that each individual is assumed to develop a final behaviour which is function of his or her view of the "world", which in turn is guided by "rules" or "theories" to organise their lives within the physical world (Gengler et al., 1995a).

[8]A construct can be defined as "a property attributed to several events, by means of which they can be differentiated into homogeneous groups" (Kelly, 1955: 20).

4.5.2 A Micro-Psychological Perspective

Also a link between the MEC model and the value[9] research has been established (Reynolds and Gutman, 1988). During the last decade, the new applications of value theory to marketing problems have taken two theoretically-grounded perspectives (Reynolds, 1985):

1. the ***macro-sociological*** approach, quantitative in essence, using standard survey research methodology, aimed at clustering individuals into groups defined by ***a priory*** specified value orientations.
2. the ***micro-psychological*** perspective, qualitative in nature, which uses ***in-depth qualitative methods*** to understand consumer motivations. This approach does not adopt ***a priory*** any assumptions.

The ***macro-sociological*** approach, though strong on face validity, fails to provide an understanding of how consumers link the attributes that exist in products, the consequences provided by these attributes, and the personal values the consequences reinforce (Valette-Florence and Rapachi, 1991). Consistent with current distinctions in cognitive psychology, ***micro-psychological*** researchers argue that all elements of the means-end chain are available (Reynolds and Gutman, 1988).

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[9]"A value is defined as an enduring prescriptive or proscriptive belief that a specific end state of existence or specific mode of conduct is preferred to an opposite end state or mode of conduct (Rokeach 1968, 1973). These values are considered the important principles guiding one's behaviour throughout life" (Bearden et al., 1993: 83).

Within the value research framework, ***micro-psychological*** researchers persuasively argued that personal values are a source of attitude and preference (Rosenberg, 1956; Vinson, Scott, and Lamont, 1977; Howard, 1977). Particularly relevant to attitude theory was the Expectancy-Value Theory (Rosenberg, 1956), which has provided evidence showing that individuals learn how to associate particular product attributes with specific consequences. However, it is important to distinguish between consumers' perceptions of these attributes and the objective reality of the attributes themselves:

"***It is essential to distinguish between the attributes per se and the consumers' perceptions of these attributes, because consumers differ in their perceptions. It is the perception that affects behaviour, not the attribute itself. "Attribute" is often used to mean choice criteria, but this leads to confusion. To use "attribute" when you mean not the attribute itself but the consumer's mental image of it, is to reify what is in the consumer's mind***" (Howard, 1977: 28)

Howard's (1977) model is one of the earliest comprehensive models of consumer choice that attaches paramount significance to the influence of consumer values on purchase outcomes. The model assumes that the choice of products or services is ultimately a means by which consumers achieve important personal values.

4.5.3 Assessing Consumers' Cognitive Structure

During the 1990's, marketing research on personal values received substantial attention from both academics and practitioners (see for example Botschen, 1999; Claeys et al., 1995). Adopting this more ***micro-psychological*** perspective of the market place, recent studies have shown the interest of the MEC theory in developing and assessing communication strategies and advertising practices (Reynolds and Whitlark, 1995; Reynolds and Gengler, 1991; Reynolds and Craddock, 1988). In line with these studies, MEC is also concerned with obtaining insight into consumers' buying motives: "*consumers...learn to choose products that have certain attributes as an instrument to obtain the desired consequences, which means the combination of two aspects: motivation and the cognitive structure* (Reis, 1997: 163). Therefore, MEC theoretical framework can simultaneously be faced as a modern variety of Dichter's (1960) motivation research, in the sense that it tries to identify insights regarding the motives involved in a certain consumption. The previous assumptions reinforce one of the most important differences between the MEC framework and the Expectancy-Value Theory (Rosenberg, 1956) in terms of the focus of analysis:

"***It is the person that is the focus of study, not the product*** " (Reynolds and Gutman, 1988: 16).

It is possible to argue, however, that MEC Theory was also inspired by the Expectancy-Value Theory (Rosenberg, 1956), which reinforces the importance of the linkages between the product attributes and the consequences of their use for consumers' choice. That is, MEC explains how the perceptions of attributes, not the concrete aspects of the product, are linked to consequences, "***which in turn move consumers toward valued end states***" (Gutman, 1982: 62).

Analysis of MEC roots and sources of inspiration suggests that understanding the differences between the MEC theory and other explanations of consumer behaviour derives from recognising the various alternative cognitive and motivational frameworks which underpin them (Grunert and Grunert, 1995; Grunert et al., 1995). The various roots of and sources of inspiration for MEC Theory development (Gutman, 1982) do not preclude a clear teleological identification with the "cognitive behaviourism". That is, the MEC model organises the laddering procedure in order to retrieve an excerpt of the consumers' cognitive structure, contingent upon the situation and the motivational state of the individual. As situations play a critically important role in any cognitive structure theory of self by determining which self-knowledge is activated from memory, it is possible to use MEC theoretical framework for connecting product knowledge to self-knowledge (Walker and Olson, 1991).

4.5.4 The Contribution of MEC Theory to Goal Structures Research

Recent research on consumer behaviour has highlighted a degree of polarisation over goal structures associated with the motivation research tradition (Pieters et al., 1995). It should be noted that the MEC approach to consumer goal structures represents an important theoretical link between psychological theories concerning the self-regulation of behaviour and action identification and the work in marketing on MEC structures of consumer product knowledge (Pieters et al., 1995; Bagozzi and Dabholkar, 1994; Huffman and Houst, 1993). This intimate connection between cognitive and motivational theoretical frameworks is particularly evident within the cognitive schemes approach proposed by Bagozzi and Dabholkar (1994). With the rigour of this study as a notable example, it can be said that the importance of goals and their hierarchical structures has given researchers the opportunity to link MEC theoretically to consumer behaviour through expectancy-value models. These researchers have provided evidence showing that it is possible to use MEC theory and its laddering methodology to derive the goals structures relevant to consumers for recycling. That is, using the MEC framework, the Laddering approach investigates how situational factors lead to the activation of subsets of cognitive structures. According to this version of the basis for goal setting, the consumption of products is ultimately a

means for achieving important values in the domain of goal-oriented behaviour, which is a promising approach for modelling consumer goal structures:

"*The hierarchical structure of superordinate goals constitutes a fundamentally different representation of the consequences of goal pursuit and goal achievement than expectancy-value models. Unlike the point-form summation of products of beliefs and evaluations, the hierarchical goal structure models the pattern and interdependence amongst goals*" (Bagozzi and Edwards, 1998: 617). These hierarchical goal structures are ***cognitive schemas*** (Austin and Vancouver, 1996) that influence goal intention:

"*We attempted to show that the cognitive and motivational foundation for goal setting is more complex than currently depicted in leading theories. The motivation for a goal intention was found to be dependent on cognitive schemas people hold with respect to superordinate goals that a focal goal fulfils* (Bagozzi and Edwards, 1998: 619).

Both the Bagozzi and Edwards' (1998) and Bagozzi and Dabholkar's (1994) studies suggest that their line of investigation is more concerned with overcoming the problems presented by the expectancy-value approaches than with having any influence on the MEC's theoretical framework:

"*One drawback with expectancy-value representations is that they fail to capture the underlying structure, if any, amongst cognitions or beliefs*" (Bagozzi and Edwards, 1998: 606).

These studies, while adapting schema theory (i.e., information already stored in memory that is important to organise consumers' self-knowledge of a particular domain), regard the principles derived from network analysis not as measures of cognitive structure, but as a "reconstruction" of relevant information in terms of self-regulation, which constitute the ultimate goals or standards for behaviour. Given this perspective, it is possible to view the previous studies as a new theoretical effort to develop a conceptual and methodological framework for investigating consumer goal structures. The same studies may also indicate "*that motivational research may be experiencing a renaissance in marketing and consumer behaviour*" (Pieters et al., 1995: 227).

The contribution of MEC theory to motivational studies reflects not only its capacity in "measuring" consumers' consumption-relevant cognitive structures ***(micro-psychological perspective)***, but also its flexibility to complement or substitute other theoretical personal values approaches. It is important to stress ***again*** that MEC theory's ***capacity*** and ***flexibility*** do not preclude or diminish its epistemological status.

4.5.5 The Objectives

The motivational and the cognitive paradigms have different objectives when explaining consumer behaviour. While the former tries to understand the consumer's basic motives that are present in her/his daily shopping behaviour, the latter is concerned with two different topics (Reynolds and Gutman, 1988):

1. the way consumers obtain and analyse information from the environment; and
2. the way they relate this consumption-relevant knowledge to information already stored in their minds in order to understand its influence to consumers' behaviour.

According to this cognitive perspective, MEC (and its laddering technique) is a procedure that tries to identify the process through which consumption relevant information is organised within cognitive structures, which in turn guide consumers' choices (Gengler et al., 1995a). Therefore, MEC is supposed to obtain the precise verbal information to develop the links between attributes, consequences and values (Gutman, 1982; Olson and Reynolds, 1983; Reynolds and Gutman, 1988; Gutman, 1991; Gengler and Reynolds, 1995). This is fundamentally different from previous approaches:

"***Most marketing research has focused on only one level of consumers' product knowledge - typically the attribute level, occasionally the benefit/ consequence level. Unfortunately, as we noted earlier, attention to a single level of meaning gives marketers only a partial understanding of consumers' product knowledge***" (Peter and Olson, 1987: 116-117).

The information already stored in memory is a vital cognitive asset that consumers use to direct their behaviour towards the attainment of desired personally-relevant values. It follows, then, that MEC would be a theoretical framework whose objective is to understand how consumption of that vital information is stored and organised in memory in different category structures (Gutman, 1982).

At the most basic level, the objective is to distinguish and examine the ***content*** and ***structure*** of consumer knowledge in order to organise it in means-end chains. The former identifies the specific means-end concepts mentioned by respondents, while the latter refers to the pattern of relationships between concepts. These concepts can be classified according to their level of abstraction (i.e., attributes, consequences and values). For example, women who are concerned about osteoporosis may look for information that enables them to identify high-calcium foods which include not only milk, cheese and fresh fish, but also certain vegetables and other products. All these different products are organised in

different cognitive categories according to the consumer's knowledge of the topic. As knowledge is not a uniform asset among people, these cognitive structures[10] represent deep structure differences (i.e., patterns of relationships between concepts) that are related to nutritional mechanisms. Understanding these differences, would be important for connecting the product attributes, their consequences and the values (i.e., the concepts) that guide the choice. That is, it would be necessary to have insight into women's life style and subjective product meanings with regard to those high-calcium foods. More specifically, the objective of MEC theory and its laddering approach would be to give insight into how women mentally link the purchase and consumption of high-calcium foods to the attainment of life values, and into which possible demotivating factors (product attributes-consequences) prevent women from buying and consuming some of these products. These salient reasons for purchase may, possibly, be derived from more important goals and values, and we will look at the contribution of the laddering technique in providing guidance about this motivational process (e.g., how to identify these goals and values).

[10] "The marketing constructs of product class, benefit segment, usage situation, and evoked set all entail some type of category structure for competing brands" (Alba and Hutchinson, 1987: 415).

4.6 LADDERING TECHNIQUE

In order to retrieve the attribute-consequence-value chain, a one-to-one in-depth interview technique called "Laddering" has been the method most advocated and used to understand the relevant excerpts of consumers' cognitive structures (Reynolds and Gutman, 1988).

4.6.1 Elicitation Techniques

In its structure, the Laddering technique is considered an extension of the Repertory Grid technique (Kelly, 1955): "*The means-end chain model used by the authors in extending the Repertory Grid procedure follows the scheme presented by Gutman (1982)*" (Reynolds and Gutman 1984: 157). However, the Laddering technique, in contrast with the Repertory Grid technique, does not "oblige" the respondent to perform a series of triadic[11] sorts to define the way in which certain physical attributes of products are linked to his or her personal values during product consumption. Complex methods like triadic sorting have been found to be more time consuming than other methods without providing better results: "*Thus, in general there seems to be little reason to apply complicated sorting procedures like triadic sorting, when eliciting attributes for low involvement products*" (Bech-Larsen et al., 1997: 20).

[11] Triadic sorting is a technique developed by Kelly (1955) with the purpose of mapping cognitive structures. The sorting procedure starts by the respondent being shown triple combinations of the product concerned. For each triple combination, the respondent is repeatedly asked for an important attribute on which two of the products are alike and at same time different from the third.

The intimate connection between the laddering technique and the hierarchical structure of attributes, consequences, and values, that has been established within the MEC theoretical framework, provides the theoretical and conceptual structure to link consumers' values to their behaviour. To elicit the connections between these hierarchical structures, other techniques of eliciting distinctions rather than triadic sorting have been found to be relevant (Reynolds and Gutman, 1988). Particularly important has been the method known as '*differences by occasion*', which evokes a product-use situation familiar to the respondent in order to create a personally meaningful context within which is easier to elicit the distinctions: "*Attention to the context of consumer behaviour provides a more meaningful context for laddering to proceed. People do not use or consume products in general; they do so in particular contexts* " (Reynolds and Gutman, 1988: 15).

The evocation of a product-use situation provides a meaningful semantic structure within which the respondent is able to move from attributes to consequences and from this to personal values. Using specific interviewing approaches like '*evoking the situational context*' to reinforce the consumer's familiarity with the consumption act, facilitates content analysis. Furthermore, these verbatim transcriptions are more realistic because they represent the "real" world of the respondent's product consumption. As a result, evoking the situational context facilitates the

laddering procedure and respondents are able to develop better associations between ***means*** and ***ends***, because

"***it is the person that is the focus of study, not the product. Therefore, it is essential to elicit from respondents the most relevant occasions for product consumption and to use these as the focus of the interview***" (Reynolds and Gutman, 1988: 16).

The purpose of the discussion on Laddering elicitation techniques is to illustrate further the relevance of understanding ***means*** and ***ends*** that can be obtained when the interviewer keeps the focus of the discussion on the consumer rather than on the product or service. What seems to emerge is that the technique to elicit the hierarchical attribute-consequence-value chain is only effective when the researcher embraces the conviction that it is only possible to understand groups of respondents after a complete understanding of the individual respondent. Given this perspective (Gutman, 1982), it is possible to argue that attention to the context of consumer behaviour is of paramount importance for achieving the full "***understanding of how consumers derive personally relevant meaning about products***" (Gengler and Reynolds, 1995: 19). However, one point should be kept clearly in mind when choosing the best technique to develop the laddering approach:

"*the choice of elicitation technique should depend on the purpose of the particular study*" (Bech-Larsen et al., 1997: 20).

4.6.2 Objectives

The laddering procedure, following the MEC theoretical framework, seeks to explain how products or services, as ***means***, are linked to ***ends***, which are a person's values. That is, the objective of laddering is to elicit meaningful differences between products in order to understand "*how a product or service selection facilitates the achievement of desired end states*" (Gutman, 1982: 60). As a result, laddering methodology is the process through which it is possible to elicit the way consumption-relevant knowledge is stored and organised in human memory. According to this cognitive view, the laddering procedure is able to analyse information that consumers obtain from the environment, which in turn is connected to information already stored in memory (i.e., cognitive category structure on Alba and Hutchinson (1987) terminology).

Assuming that "*means-end chains are hierarchical cognitive structures that model the basis for personal relevance by relating consumers' product knowledge to their self-knowledge*" (Olson, 1995: 189), the laddering technique has as its supreme objective, the identification of criteria consumers use in their decision-making process. Such information permits marketers to design products that are more likely to be adopted and to promote their products more effectively.

4.6.3 Interview Environment

Reynolds and Gutman (1988) have suggested that the interview environment is an important factor for obtaining an in-depth understanding of the consumer's decision-making. Two rules were advanced:

1. the interview environment must avoid any "fear" for the respondent in terms of quality of responses; and
2. the respondent has to feel that he or she is the real expert in the matter.

To overcome the respondent's initial suspicion about the interview objectives, the interviewer must explain in the introductory comments the reasons of the study, as well as to be explicit about the lack of any kind of evaluation in terms of write or wrong answers.

To reinforce the initial process of relaxing the respondent, the sequence of the conversation should be guided by an introduction to the focus of interview in such a way that the individual understands that he or she has the ability to think critically about the connections between product/service choice and personal motivations. This introspective effort must be supported by the idea that the interviewer is there only to understand how "expert" people organise their everyday commonplace behaviours. That is, interviewers must be friendly and interested trained facilitators of a discovery adventure, rather than investigators who are completely aware of

the code of good practice on any type of consumption decision-making process. This creates an interview environment in which the respondent has total "control" of the discourse, while the interviewer assumes a low profile, in order to "*create a slight sense of vulnerability on the part of the interviewer*" (Reynolds and Gutman, 1988: 13). In line with this interview environment, the initial questions must reinforce the respondent's "expert" status. Without loosing the control of the interview, the "***why is that important to you***" format of the interviewer questions must be assumed by the respondent as natural in the context of the discourse, and in line with certain specific guidelines that the interviewer has to follow. Furthermore, the interviewer's questions reinforce the respondent's perception of how important it is to dig deeply into his or her mind to prove their "expert" status. Subsequently, it is possible to make the respondent feel that the interviewer has a real but not vested interest in the topic.

The laddering procedure, as with all qualitative research, is based on a natural flow of speech of the respondent. In this context, the interviewer's role is minimal and directional (i.e., soft laddering), to avoid respondents retrieving episodic, instead of semantic, information (Grunert and Grunert, 1995). However, this task requires considerable cognitive processing effort from the interviewer in order to develop a deep understanding of how consumers translate the attributes of products into meaningful associations

with respect to self, following Means-End Theory (Gutman, 1982). The interviewer's capacity to translate respondent's "chunks" of information into means-ends chains it is vital for the accuracy of data. This is only possible if the respondent feels comfortable and encouraged to reveal ***why*** each reason for the consumption behaviour is important to him or her personally. Finally, the respondent is "invited" to reflect on deeper motives behind the answers to the questions about the original reasons. This laddering procedure only finishes when a set of means-end chains reveals the self-knowledge structures containing interconnected meanings about goals or values for that concrete consumption behaviour.

4.6.4 The Soft Laddering Interview

Laddering is based on a tailored interviewing format using, primarily, a series of directed probes, typified by the "***Why is that important to you***?" question. This tailored interviewing format is developed in a face-to-face context wherein an interviewer asks a sequence of in-depth probes designed to force the consumer up the ladder of abstraction, in order to retrieve deeply into his/her motives in decision-making (Reynolds and Gutman, 1988).

The laddering approach is based on a two-step interviewing process (Reynolds and Gutman 1988; Claeys et al., 1995):

1. Elicitation of salient criteria used to discriminate between products; and
2. The salient attributes will be used for further questioning in order to obtain the product consequences and personal values.

Initially, respondents are given a simple categorisation or sorting task, which is designed to elicit basic concepts or distinctions consumers use to differentiate between the stimuli (e.g., products or brands) within the domain of interest. Thus, laddering "*consists of a series of directed probes based on mentioned distinctions initially obtained from perceived differences between and among specific brands of products or services*" (Reynolds and Gutman, 1988: 13). These basic distinctions are typically made at the relatively concrete product attribute level, although distinctions at the other higher-order consequence and value levels are also possible.

The categorisation process takes place at each level of the means-end chain in order to understand which components the consumers emphasise most. The emphasis of the laddering approach is different from that of more traditional multi-attribute models of choice, particularly those that follow the triadic sorting (Kelly, 1955) through the Repertory Grid procedure. The laddering procedure focuses mainly on ***why*** and ***how***

product attributes are important in terms of consequences and personal values, while the Repertory Grid concentrates on determining ***if*** and ***to what degree*** particular product attributes are important. The ***why*** procedure uses an open-ended questioning format to encourage the respondent to give an answer specific to their own particular thoughts, and in their own words. Specifically, the subject is presented with one of the distinctions elicited from the categorisation task and asked "***why*** is (this distinction) important to you?". His or her response is then used as the focus of the next "***why*** is that important...?" question. With such an approach it is possible '*to force*' the respondent up or down the '*ladder of abstraction*', bridging relatively concrete product meanings at the attribute level to more abstract meanings at the consequence and personal-values levels. This is the reason why this procedure is called "laddering" (Reynolds and Gutman, 1988; Klenosky et al., 1993). The questioning process will be finished only when the attribute-consequence-value chain of the individual is defined. That is, the ***soft laddering interview*** will be developed until the retrieved information from the respondent constitutes a "ladder". What seems to emerge is that the MEC approach, as a model of personal relevance, uses the laddering technique as a sort of repetitive questioning process through which it is possible "*to force the subject up the ladder of abstraction until the value level is reached*" (Claeys et al., 1995: 194).

In the consumer context, knowledge and prior experience in the product category gives a greater ability for solving consumption problems in terms of a solution strategy (Alba and Hutchinson, 1987; Johnson and Russo, 1984; Bettman and Park, 1980). As a result, the number of ladders elicited from each individual respondent varies according to his or her knowledge, prior experience, or involvement in the product category (Bech-Larsen et al., 1997; Grunert and Grunert, 1995; Gengler and Reynolds, 1995; Reynolds and Gutman, 1988). It follows from these assumptions that the number of multiple ladders across respondents is expected to vary. Furthermore, during the ***soft laddering*** procedure, the respondent may use the same adjacent concepts several times when verbalising different ladders. When this occurs "*the association is only counted once per respondent when constructing the implication matrix in order to prevent bias in the aggregate results*" (Gengler and Reynolds, 1995: 24-25). Resulting hierarchical maps (which summarise the most frequently evoked means-end paths) are then interpreted within an associative-memory framework: "*The attribute → consequence → value linkages elicited from consumers through a laddering technique lead to the development of a hierarchical value map (HVM)*" (Valette-Florence and Rapachi, 1991: 40). It follows, then, that the purpose of the ***soft laddering*** procedure is to elicit distinctions at higher levels of abstraction.

4.6.5 The Hard Laddering Interview

The classic method for implementing the laddering technique is a face-to-face interview (Reynolds and Gutman, 1988). More recently, this one-to-one in-depth interview technique (***soft laddering***) has been substituted by a "***paper-and-pencil***" version of the laddering procedure, known as ***hard laddering*** (Botchen et al., 1999; Frauman et al., 1998; Grunert and Grunert, 1995; Pieters et al., 1995; Bagozzi and Dabholkar, 1994; Walker and Olson, 1991). In these studies, a questionnaire was administered simultaneously to a group of respondents, in contrast with the open-ended format of the laddering interviews. Although this approach represents an attempt to find more cost-effective and efficient methods of data collection, it is limited the insightful probing characteristic to laddering (Gengler and Reynolds, 1995). This ***paper-and-pencil*** operationalization of laddering "*refers to interviews and data collection techniques where the respondent is forced to produce ladders one by one, and to give answers in such a way that the sequence of the answers reflects increasing levels of abstraction*" (Grunert and Grunert, 1995: 216).

While Botchen et al. (1999) and Walker and Olson (1991) used only self-administered questionnaires as their data collection method to obtain ladders, Bagozzi and Dabholkar (1994) began with a ***paper-and-pencil*** version of the laddering procedure. This was modified to fit the ***telephone***

interview context that was used to elicit the personal motives or goals of respondents for recycling.

Other researchers used both ***soft*** and ***hard laddering*** in similar studies (see for example Frauman et al., 1998). The questionnaire contained a ***paper-and-pencil laddering interview*** with three sets of questions which were designed to assess the means-end relationships that park visitors perceived as relevant when selecting interpretive service offerings. The classic approach (i.e., ***soft laddering***), based on a preference-oriented sorting task (Reynolds and Gutman, 1988), was applied to elicit the basic distinctions that these park visitors used to choose among different interpretive services. The authors drew particular attention to the problems that can occur during data collection when engaged in both the ***soft*** and ***hard*** laddering interview process (Grunert et al., 1995; Grunert and Grunert, 1995).

The ***soft*** approach has been found particularly suitable for respondents whose ***cognitive structure*** with regard to the product or context in analysis is either ***especially weak*** or ***especially sophisticated.*** The former has been found to be linked to low involvement and/or little experience with the product, while the latter embraces very elaborated cognitive structures "*due to high involvement and much experience, such as when the respondent is an expert in the respective area*" (Grunert and Grunert, 1995: 217).

The ***hard*** approach has been proposed in cases of average involvement and experience, or whenever the classic laddering interview may produce artificially abstract hierarchical levels derived from respondents' cognitive efforts to find arguments for their buying behaviour. Some researchers argued that ***hard laddering*** reduces the influence of cognitive processing on the interviewer side, and subsequent bias on the data collection that can be found with ***soft laddering*** (Botschen et al., 1999).

4.6.6 The Predictive Validity of Laddering

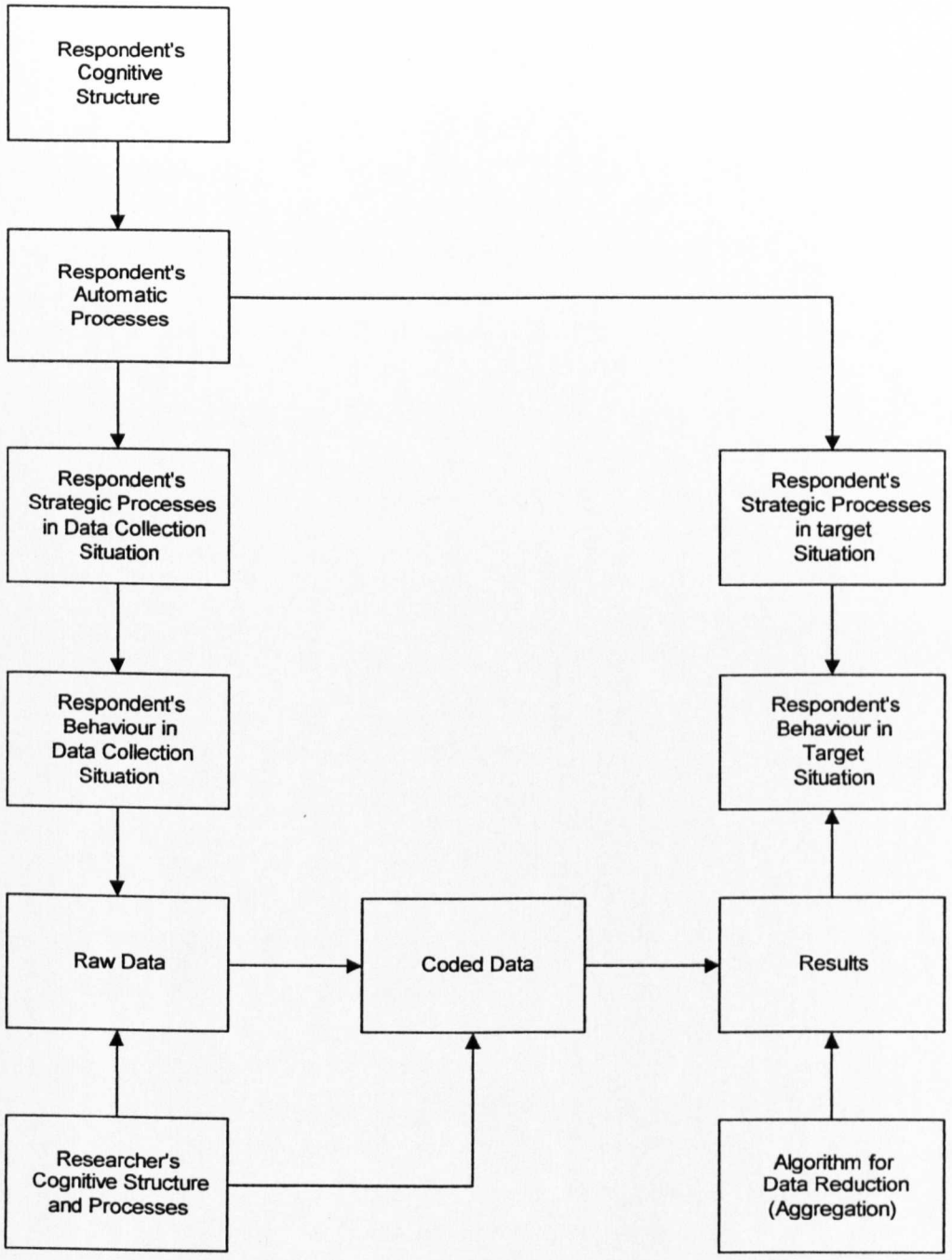
Consumers have the faculty to use ***automatic*** or ***strategic*** cognitive processes to retrieve information from cognitive categories stored in memory (Grunert and Grunet, 1995). The former is unconscious, not subject to capacity limitations, and quite invariant with regard to different task requirements. By contrast, the latter is conscious, subject to capacity limitations, and easily adapted to task requirements. In this case, an intentional, problem-solving mental activity, like trying to find meaning in unfamiliar stimuli, may be activated:

"***One way to understand a means-end framework is to think of consumer decision-making as a problem-solving process***" (Reynolds and Whitlark, 1995: 9).

Consumers use the interaction between cognitive structures and cognitive processes to develop their decision-making in different contexts. Consumer behaviour in a data collection situation, such as the laddering task, is not an exception to this cognitive capacity. In line with this reasoning, it is possible to argue that there is no capacity to retrieve a real and pure representation of cognitive structure, because the behaviour of any respondent in a data collection situation is the result of ***automatic*** or ***strategic*** cognitive processes to retrieve information from cognitive categories stored in memory. Implications for the evaluation of the validity of the results from laddering are obvious (see next page – Figure 4.3):

- Firstly, it is inevitable that coded data include not only the respondent's "impure" cognitive structure, but also the researcher's cognitive structure and processes, who, because of the nature of the process, has an impact on data collection.
- Secondly, the algorithm for data reduction, may also influence the predictive validity of the data collected with regard to the target situation (Grunert and Grunert, 1995).

Figure 4.3: *A general cognitive model for data collection, analysis and prediction*



Nevertheless, it is possible to improve the predictive validity of ***soft*** laddering and a number of criteria for doing so have recently been advanced (Grunert and Grunert, 1995):

1. ***The raw data should be the result more of the respondent's cognitive structures and processes that of the researcher's cognitive structures and processes.***

- The typical example of violation of this first criteria are Fishbein-type rating scales, because the cognitive categories are specified in advance, without any intervention from the respondent. As a result, the output of this methodology, which is supposed to measure the respondent's cognitive structure, is influenced by the researcher's cognitive structures and processes.

2. ***The data collection should not involve strategic processes not typical of the target situation.***

- The context within which the behaviour is to be predicted (i.e., the target situation) must be reproduced in the context of the laddering interview, in order to improve the correlation between the former and the latter.

3. ***Coding should preferably be based on cognitive categories widely shared among both consumers, researchers, and users of research results, and not on the researcher's idiosyncratic cognitive categories.***

- In order to avoid interviewer influence on the coding scheme, secondary data, or any other formal information attached to respondents behaviour, particularly previous studies on the topic, are helpful for developing a common understanding of the cognitive categories widely shared among both consumers, researchers, and users of research results.

4. ***The algorithm used for data reduction (aggregation) should be based on theory about cognitive structure and processes.***

- The aggregation process is supposed to be derived from the theoretical framework from which the language of the concepts is translated into cognitive categories, representing the aggregate of the respondents ladders. This summarisation of the means-end study results should not be influenced by wrong technical decisions that are important for determining which connections should be represented on a Hierarchical Value Map. To accomplish this, an implication matrix has to be developed.

4.6.7 The Implication Matrix

After collecting a significant number of ladders, the researcher is able to shift from the individual level to the group level (Gutman, 1991). When individual data are combined, what emerges are the relations that occur most frequently across respondents. This first movement generates data of an aggregate cognitive structure of a group of interviewees. That is, the implication matrix that derives from laddering data does not address the issue at the individual level. The process of creating an overall element by element matrix in which all direct and/or indirect relations are counted is the basis for this approach. To perform such a movement, the researcher encapsulates each laddering response within the correspondent level of abstraction (i.e., attribute, consequence, or value). That is, after performing the content analysis, the researcher is able to determine the number of **direct** and **indirect** relationships between attributes, consequences and values. This second movement in the procedure involves the definition of an ***Implication Matrix***. In its goals' version, "*It is a square matrix Z whose elements (z_{ij}) reflect how often goal i leads to goal j, where this is based on an aggregation across respondents and linkages*" (Bagozzi and Dabholkar, 1994: 326). The implication matrix subsumes "*the number of times two adjacent levels in the ladder were connected by some respondents*" (Claeys et al., 1995: 194).

In accordance with previous considerations, the implication matrix displays the number of times each attribute leads to each consequence, or the number of times each consequence leads to each value. However, the implication matrix encapsulates two types of relations:

1. **direct** relations; and
2. **indirect** relations.

The former represent adjacent levels, which are the normal sequential order within the ladder, while the latter has a more indirect sequence. In filling in the implication matrix, individual respondents' ladders are decomposed into their direct and indirect components in order to construct a hierarchical value map.

What seems to emerge is that there are many ways to study the linkages between consequences stemming from consumer choice and the personal values that may be related to that choice. Nevertheless, "*one goal of values research is to specify the content and sequence (or structure) of outcomes stemming from choice behaviour that extends from attributes possessed by the choice object through consequences to "end benefits" or personal values*" (Gutman, 1991: 143). This is the particular goal of the laddering approach and its implication matrix.

4.6.8 The Hierarchical Value Map (HVM)

Laddering and MEC are concerned with obtaining insight into consumers' buying motives, within a specific consumption context. As a result, the data obtained from a laddering interview will represent consumers' cognitive excerpts with situationally constructed meanings (Grunert and Grunert, 1995). That is, a common output of a means-end study is a tree-like network diagram called a Hierarchical Value Map, or HVM (Gutman, 1982; Reynolds and Gutman, 1988). This graphical representation of the aggregated cognitive structure of respondents, reflects their perceptions in terms of products' physical attributes, the benefits provided by their use, and the values they satisfy (Olson and Reynolds, 1983). Therefore, it can be said that an HVM presents a graphical representation of a set of means-end chains which can be thought of as an aggregate (e.g., market-level) cognitive structure map (Grunert and Grunert, 1995).

An HVM consists of nodes and lines which connect these nodes. The nodes of the HVM represent the most important conceptual meanings (typically classified as attributes, consequences, and values) derived from data collection and analysis. The line segments connecting these nodes represent the associations between these concepts, which can be used to define marketing and promotion practices (Frauman et al., 1998; Klenosky et al., 1993).

Just a quick glance at these figures representing HVMs show that different pathways can be identified within each ladder. It follows, then, that "*each unique pathway from an attribute to a value in the HVM represents a potential perceptual orientation or positioning for the product or service in question*" (Frauman et al., 1998: 164). In Gengler and Reynolds' (1995) words, "*the HVM represents the patterns of meaning by which individuals give personal relevance to product distinctions*" (ibidem: 27). However, until a couple of years ago, building a coherent HVM was not an easy task:

"*The manual compilation of the association chains in itself represent an extraordinary work, and makes the use of samples a little more than thirty interviews totally impractical*" (Reis, 1997: 165).

Due in part to the difficulty of drawing an HVM with a minimum of crossing lines, Reynolds and Gutman (1988) point out that considerable ingenuity is required when building a coherent map. Researchers who were seriously analysing laddering data needed to develop their own software to implement Reynolds and Gutman's (1988) approach or needed to develop their own analytic approaches to obtain HVM maps. However, in 1995 LadderMap became available. It was the first commercially available, personal computer-based software for analysing laddering data in order to produce HVM maps (Gengler and Reynolds, 1995).

4.7 LADDERMAP: The Algorithm for Data Reduction

Some researchers developed an inventory of problems which were related to MEC's epistemological status, as well as its approach to data collecting, coding, and analysis and the validation of results from a laddering study (Grunert et al., 1995; Grunert and Grunert, 1995). Nevertheless, despite criticism, several aspects of Means-End Theory and Laddering have received increased attention because they open space to the adoption of different strategies on the part of the companies and the communication devisers (Reis, 1997). For example, some researchers addressed the application of the MEC theory and and its laddering technique to marketing strategy (Frauman et al., 1998; Reis, 1997; Klenosky et al., 1993, Reynolds and Craddock, 1988; Reynolds and Gutman, 1984; Olson and Reynolds, 1983). While others apply Means-End Theory as a conceptual framework for the strategic assessment of advertising (Reynolds and Gengler, 1991; Reynolds and Rochon, 1991). Still others addressed research methodology (Valete-Florence and Rapacchi, 1991; Reynolds and Gutman, 1988), or even adaptive selling behaviour (Gengler et al., 1995b). In summary, MEC and its laddering approach should be viewed as a method for developing insights about potential means-end chains that underlie purchase decisions. However, three major practical problems emerge in the use of MEC and its laddering technique:

1. the significant time and cost of gathering individual in-depth data;
2. the time and effort required to perform the content analysis of the qualitative responses (steps in the ladders) and the quantitative summaries of the dominant pathways; and
3. the lack of any detailed framework or system to translate strategic options as represented in the summary HVM into a working format for researchers and marketing strategists.

Most of these practical problems, particularly the time and effort to perform the content analysis, have been solved through a new algorithm for data reduction: LadderMap software (Gengler and Reynolds, 1995). Although LadderMap is not an automated interviewing protocol for collecting laddering data through a computer-driven interview, three main tasks can be performed with laddering interview data in hand (Gengler and Reynolds, 1995). The software does the following.

- Provides a ***data entry*** and ***content analysis*** system for qualitative laddering data;
- Tabulates an ***implication matrix***, portraying the degree of connection between the various attributes, consequences, and values; and
- Creates a ***HVM map*** from the implication matrix and enables the user to edit the ***HVM*** or otherwise make it easier to use and understand.

4.7.1 Data Entry and Content Analysis

The study of cognitive structure has recently examined techniques for collecting ***means*** and ***ends*** (Aurifeille and Valette-Florence, 1992; Valette - Florence and Rapachi, 1991; Walker and Celsi, 1989; Reynolds and Gutman, 1988), as well as methodological improvements for analysing means-end data once it has been collected (Klenosky et al., 1993; Valette-Florence and Rapachi, 1991. Recently, personal computer-based software has become available for implementing Reynolds and Gutman's (1988) laddering approach to developing HVM maps. An academic research version of LadderMap (Version 5.3), from Chuck Gengler's Means-End Software (Lastovicka, 1995), was used in this study (see Appendix Five).

The LadderMap program can handle up to 3000 different ladders. However, meticulous care must be taken when coding the interview results into the LadderMap software. At this stage, two important decisions must be made by the researcher in order to avoid adulterating the data.

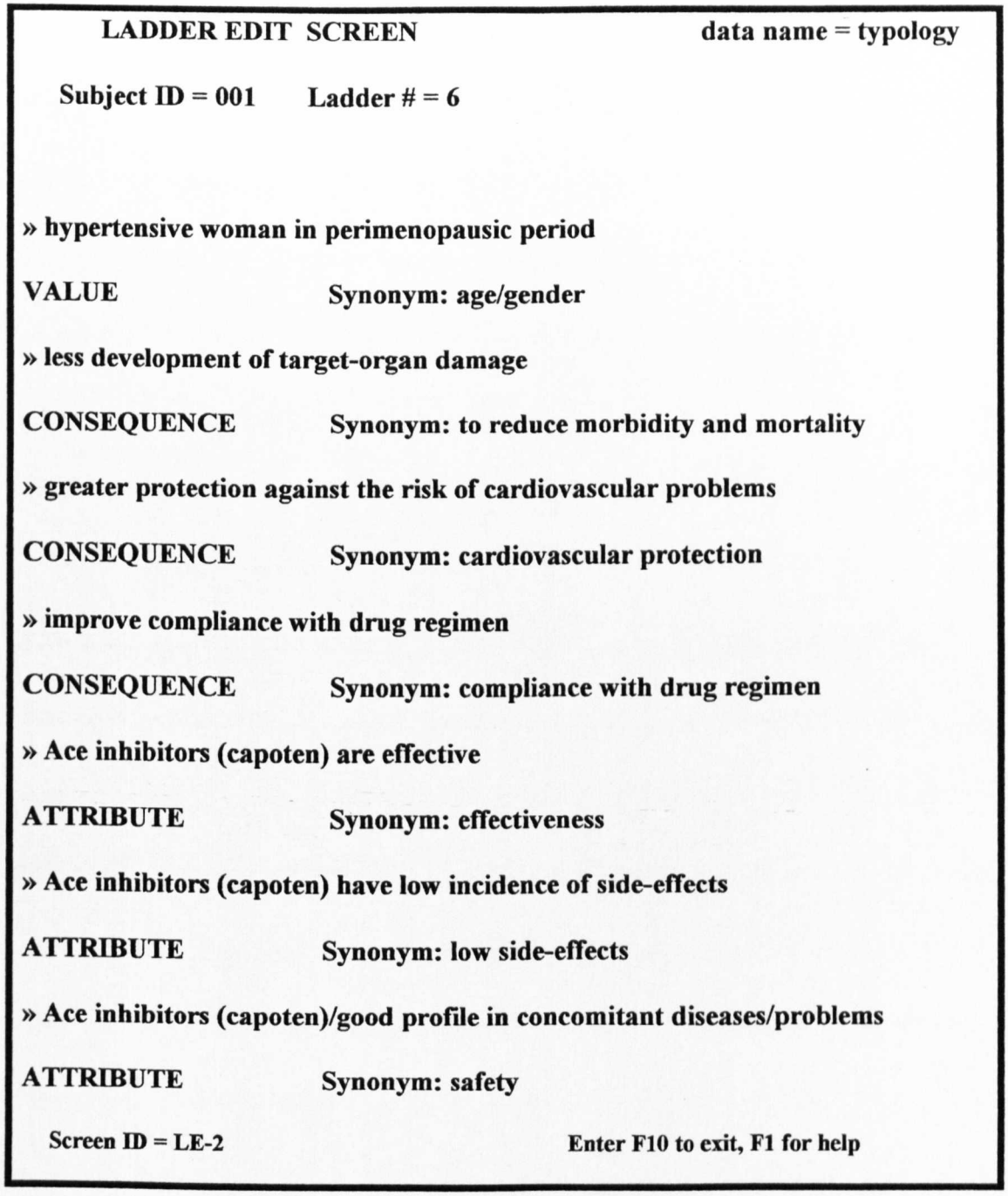
First of all, due to the conversional nature of laddering, the analyst must be able to distinguish relevant meaning from conversation extraneous to the topic at hand. As the laddering procedure is based on open-ended, in-depth interviews, the conversional nature of raw data that are obtained, forces the researcher to desegregate the ladder responses of each respondent into "chunks" of meaning.

Secondly, the analyst must separate each individual ladder into "chunks" of meaning corresponding to the different levels of abstraction. Each chunk represents a separate concept communicated in the interview, which is the final result of a "purification" process according to what are, and are not, the relevant "chunks" to include from the verbatim responses. Specifying what composes a chunk of meaning is extremely important since these units correspond to the hierarchical structure of attributes-consequences-values that are present in any ladder, and which are thus the basis of all stages of analysis. The classification of responses must therefore be divided according to their capacity to be included in the means-end chain network. That is, LadderMap accepts data concerning the attributes, consequences and values mentioned by respondents, following the measurement model proposed by the MEC approach (Gutman, 1982).

As ladders are entered for each respondent, and as respondents are able to define a different number of ladders, an interactive data entry feature is provided which allows the researcher to enter multiple ladders per interview subject and up to ten "chunks" of meaning per ladder. In this way, ladders are entered for each respondent, and the ***first stage*** of content analysis is started (LadderMap, 1998).

An example of the ladder entry screen is shown in Figure 4.4 - Ladder Entry Screen, with an hypothetical ladder from patient typology data.

Figure 4.4 - Ladder Entry Screen from LADDERMAP Software



Next, "chunks" of meaning are content analysed in order to aggregate and generalise across subjects. That is, each "chunk" is classified according to pre-defined attribute, consequence, and value categories. This process

involves two steps. The first step aims to obtain a dictionary of content codes into which classifications of "chunks" of meaning can be made. Once data have been entered and coded, the software generates a lexical listing file that contains all these attributes, consequences, and values content codes, as well as the verbatim qualitative data that correspond to each content code. This second step is a deeper level of analysis in the sense that this vast verbatim data have to be assigned to the hierarchical codes, which form a ladder.

Developing content codes is a critical stage of the analysis, which requires several judgement-based decisions. The researcher must be able to determine the optimal level of classification. The general rule of thumb is that the codes must be broad enough to obtain replications of more than one respondent saying one element leads to another. A paradox arises if the categorisation codes become too broad, as meaning is lost through excessive aggregation. In accordance with the means-end perspective, the key here is to aim for consistency and reliability across multiple coders. This enables the analysts "*to split, combine, or redefine categories quickly and easily on line. The content analysis task is truly the heart of laddering analysis. It is the step where qualitative data (the raw, verbatim responses from the laddering interviews) are converted into nominal codes which can be quantified*" (Gengler and Reynolds, 1995: 24).

Researchers must be careful when developing content codes, and should follow two specific guidelines (Reynolds and Gutman, 1988):

1. The analysis of laddering data across respondents involves summarising the key elements to identify the concepts which are mentioned most frequently; and

2. When the researcher is unsure of what is meant by a specific statement, it may be useful to examine it in the context of the whole ladder. This will serve to reduce the risk of misclassification due to interpretation error.

It should be noted that "*where analysts typically have strong insights into consumers' perceptions and motivations, many of the category codes may be defined a priory*" (Gengler and Reynolds, 1995: 23). Otherwise, the classification procedure, which is an highly labour-intensive and recursive task, evolves into an interaction between "chunks" of meaning from verbatim responses and codes.

The LadderMap software allows content analysis to be performed interactively, in order to facilitate the researcher's intensive judgement and decision-making. This is useful when checking and correcting any mistakes which arise because concepts have been assigned incorrectly, or when evaluating the initial coding scheme: "*If, upon inspection, it is found that some concepts are assigned incorrectly, they can be easily corrected and assigned to the proper content code*" (ibidem: 23).

Also, if the initial coding scheme is very specific, many content codes may have relatively few actual concepts assigned to each (see Figure 4.5). Similar codes can then be easily grouped hierarchically under a larger code, making reassignment an easy task.

Figure 4.5 - Performing Content Analysis Interactively

» comorbidity	
hypertensive patients with left ventricular hypertrophy	n = 6
hypertensive patients with gout	n = 2
hypertensive patients with obesity	n = 4
hypertensive patients with diabetes	n = 7
hypertensive patients with anxiety/depression	n = 1
» age	
young-adult hypertensive patients	n = 19
middle-aged hypertensive patients	n = 76
elderly hypertensive patients	n = 93

F2 – EDIT SYN **F3 – Change AVC** **F4 - Track Code** **F10 Exit**

Any further analysis of the data is only as good as the content analysis. Hence, this task should not be underrated in importance.

4.7.2 Generating the Implication Matrix

The definition of connections between codes is only possible after an aggregate implication matrix has been generated. The implication matrix serves as a method of bridging the gap between the qualitative aspects of laddering to the quantitative analysis of the relations between concepts. Before an implication matrix can be generated, the number of content codes should be reduced to 120 or less. LadderMap determines the strength of association between concepts and produces a square matrix. This matrix consists of the sums of all the instances when concepts were associated during the laddering interviews. In filling in the implication matrix, individual respondent's ladders are decomposed into their direct and indirect components which represent the degree of connection between the various attributes, consequences, and values. Quite often in laddering studies, more than one ladder is collected from each subject. The number of ladders elicited from the subject is dependent on a number of factors including the subject's knowledge of the product category and the subject's ability to communicate their knowledge. A subject may repeat associations between concepts in the different ladders obtained. This matrix is constructed such that, though a given respondent may repeat the associations between the same cognitions several times in several ladders, the association between cognitions is tabulated only once per subject.

4.7.3 Generating the Hierarchical Value Map (HVM)

From the implication matrix, LadderMap is able to generate different percentages of the associations in the data that it would be possible to represent in a HVM map. This gives the researcher the opportunity to select the most appropriate percentage of association in the data that would be represented in a HVM constructed using different cut-off values (where the cut-off values refer to the minimum degree of association in the data required to support a chain in a map). Although there are no theoretical or statistical criteria to guide the selection of this powerful device for reducing the complexity of the map, two criteria have been put forward by Reynolds and Gutman (1988) for use when selecting a cut-off value:

1. ***To try multiple cut-off levels and choosing the one that gives the most informative solution;*** and
2. ***To inspect the number of active linkages as a proportion of all linkages and selecting the cut-off that achieves maximum completeness combined with ease of interpretability.***

Other researchers, based on their experience in conducting this kind of study, suggest that at least 70 percent of the relationships on the map should be represented:

"*From experience in conducting over 100 studies, the minimum threshold value should never be less than 70 percent with an average number typically in the 75 to 85 percent range*" (Gengler and Reynolds, 1995: 25).

Any cut-off point smaller than 70 percent may not represent important respondent's information and some valuable insights on consumer behaviour may be lost. However, it is important to bear in mind that a percentage cut-off point is different from a numerical cut-off point. The former represents the total percentage of direct links represented by each numerical cut-off point, while the latter, based on the implication matrix, determines what connections/associations between the hierarchical chain attributes-consequences-values should be represented on the HVM. It follows, then, the higher the chosen numeric cut-off level, the more parsimonious the representation of the HVM. Again, this stage involves important qualitative judgements made by the researcher "*to produce an HVM which is both accurate and aesthetically pleasing, hence a trade-off between validity and parsimony*" (Gengler and Reynolds, 1995: 25). Parsimonious representations, however, have a price. With high numerical cut-off points, fewer relations between the hierarchical chain attributes-consequences-values are considered. As a result, a smaller percentage of all connections between these hierarchical structures made by respondents is accounted for.

Efforts to come to a better understanding of the cut-off point decisions were made in recent research where two additional heuristics for choosing a cut-off were proposed (Pieters et al., 1995; Bagozzi and Dabholkar, 1994):

1. ***To graph the number (or percentage) of connections accounted for at a given cut-off against different cut-off levels and choosing those occurring before an elbow results***; and
2. ***To compare the proportion of active cells in the implication matrix to the proportion of total linkages accounted for at a given cut-off level.***

A final point to note here is that the LadderMap software is an heuristic-based algorithm which quickly and easily generates several HVMs based upon different cut-off points. As such, the researcher has his task facilitated in terms of cut-off point decision. Once an appropriate cut-off level has been chosen, the heuristic-based algorithm produces the HVM map. Subsequently, the HVM map can be edited in several useful ways to generate an easier-to-understand, or more aesthetically pleasing, map.

Two requirements must be observed when constructing a HVM:

1. ***the final HVM must encapsulate a significant number of the associations, which must be representative of the raw laddering data;***
2. ***the final HVM must be a rich representation of the reality in order to be easily interpretable by those people that have to use it as a viable tool.***

4.8 The Use of MEC Theory and Laddering Technique in Marketing

The dramatic increase in the number of competing brands in most product categories forces marketers to look for segmentation, positioning, and differentiation strategies that are more directly relevant to the decision-making criteria of the consumer (Botschen et al., 1999). As a result, "*The means-end chain approach has much to offer the scholar interested in developing theoretical explanations of consumer behaviour, as well as the business person interested in developing strategic solutions to marketing problems*" (Olson, 1995: 190). That is, understanding the personally relevant meanings that consumers hold for a product, and the new marketing strategies which may stem from these meanings, is invaluable to marketing strategists.

During the 1990's, a substantial amount of attention both from marketing academics and practitioners has been devoted to the means-end chain theoretical framework and the laddering technique (see for example Botschen, 1999; Mattila, 1999; Frauman et al., 1998; Reis, 1997; Sorensen et al., 1996; Gengler et al., 1995; Pieters et al., 1995; Reynolds and Whitlark, 1995; van Rekom, 1994; Bagozzi and Dabholkar, 1994; Klenosky et al., 1993; Doucette and Wiederholt, 1992; Pieters et al., 1992; Walker and Olson, 1991; Gutman 1991). Meanwhile, special issues on means-end chains have been advanced in prestigious publications (i.e., ***IJRM*** - International Journal of Research in Marketing), where several

researchers have made important contributions for the improvement of the Means-End Chain Theory and Laddering procedure (Olson, 1995; Clayes et al., 1995; Grunert and Grunert, 1995; Pieters et. al., 1995; Gengler et. al., 1995; Reynolds et al., 1995, Aurifeille and Vallette-Florence, 1995). Other special editions on Means-End Chain Theory and Laddering technique were put forward, particularly by Danish researchers (Bech-Larsen et al., 1997; Sorensen et al., 1996; Grunert, et al., 1995). An unanimous conclusion derived from these studies reveal that Means-End Chain approach and Laddering technique are important to understand what energise and directs consumer decision making. One reason for means-end chain advocates' enthusiasm about the use of the approach to represent cognitive structures seems to be the face validity of a relatively unstructured elicitation task rather than the use of pre-specified cognitive categories. As a result, academic researchers were "invited" to be more familiar with this theoretical framework: "*The major goals of this special issue are to generate greater awareness of the means-end approach and to stimulate academic researchers to conduct research on means-end issues. Although many business firms are using means-end chains and laddering methods, relatively few academic researchers have incorporated the means-end approach into their research*" (Olson, 1995: 190). Recent studies using means-end chains and laddering methods suggested that the goal proposed by Olson (1995) was obtained:

- segmentation (Botschen, 1999; Roehrich and Vallett-Florence, 1991);
- positioning (Reis, 1997);
- differentiation strategies (Doucette and Wiederholt, 1992); and
- consumer behaviour decision-making (Sorensen et al., 1996; Klenosky et al., 1993).
- adaptive behaviours of salespeople (Gengler et al., 1995b).

For example, Reis (1997) concluded that MEC model and its laddering technique were able to define a hierarchical sequence of ***values-consequences-attributes*** which were used to define the "***positioning of products and brands, and ... ways of communication***" (Reis 1997: 162). In positioning a product, the marketing strategist has the opportunity to link a particular attribute, or a set of attributes, to consequences and values which have been found relevant to a selected or particular market segment of consumers. Inherent in this strategy is the notion that the emphasised means-end chain has a specific and desirable meaning to the market segment of interest. That is, translating knowledge of consumers' cognitive structures into the development of advertising strategic operations is one of the results that it is possible to obtain with a means-end chain approach (Reynolds et al., 1995; Reynolds and Gutman, 1988; 1984; Gutman, 1984; Olson and Reynolds, 1983).

Reynolds and Whitlark (1995) also argued that: "*The means-end framework for viewing consumer decision-making leads to a means-end theory of communications strategy*" (Reynolds and Whitlark, 1995: 9).

In an application to lingerie retail, Roehrich and Vallett-Florence (1991) developed a weighted cluster-basis analysis using direct and indirect connections present in a means-ends chains approach as the basis for clustering. While these researchers have used ladders to develop their segmentation strategy, Botschen et al. (1999) using a modified laddering technique, based on MEC theory, were able to define benefit segments.

In looking at disadvantages of the standard benefit segmentation approach, the researchers concluded that the MEC theoretical framework was a powerful tool for effective market segmentation: "*Means-end chains seem ideally suited to segment markets according to different levels, benefits or values, and on the linkages between the meanings*" (Botschen et al., 1999: 54),

Using the means-end chain approach, the researchers have precluded the two most important disadvantages presented by the classic approach:

1. ***all identified attributes/benefits have to be rated by respondents, even when they are not relevant for the respondent***; and
2. ***respondents tend to rate most of the items as important which makes it more difficult to develop significant different segments.***

In a recent study on consumer behaviour, Sorensen et al. (1996) interviewed 90 respondents in Copenhagen about meat types and found out that both individual and social values were related to health and physical well-being while product attributes and consequences were linked to difficulties in buying, preparing and eating fish.

Using the LadderMap software (Gengler and Reynolds, 1995) to construct hierarchical value maps, Sorensen et al. (1996) concluded that the MEC approach and its laddering methodology were important for understanding how consumers perceive self-relevant consequences of products like fish.

In a similar vein, Klenosky et al. (1993) examined a variety of factors (ranging from the relatively tangible attributes of products, to the intangible benefits, needs, and personal values of people) to understand and explain sky destination choice. They concluded that the "*Means-end theory provides a logical framework and methodology for relating these tangible and intangible elements*" (ibidem, 1993: 362).

Laddering technique was also found important for eliciting salespeople's knowledge structures about the characteristics of sales situations: "*Of interest, then, is to gain insight into the characteristics of customers and sales situations that sales people use as cues, to uncover how these cues are linked to adaptive behaviours of salespeople, and to demonstrate the relevance and validity of these results by linking them to an external variable, such as experience level*" (Gengler et al., 1995: 288).

4.9 *The Use of MEC Theory and its Laddering Technique in Pharmaceutical Marketing*

The MEC model (Gutman, 1982) has been also found an important tool "***to help identify important dimensions of consumers' product meaning for a particular drug product or therapeutic category of drug products***" (Doucette and Wiederholt, 1992: 345), in order to develop differentiation strategies.

Based on a sample of 550 consumers of pharmaceutical products (i.e., patients), these researchers were able to identify five product dimensions and three consequence dimensions. However, rather than using the means-end chain theory and the laddering methodology to derive the attributes and consequences relevant for those patients, the authors used a 29-item semantic differential prescription product meaning scale (i.e., paper and pencil version of laddering) to evaluate their own four hypothesised dimensions of consumers' meaning for prescribed medications. Such an approach was developed "***because of a scarcity of research in this area, a domain of attributes and consequences based on professional experience and the pharmacy literature was hypothesised***" (Doucette and Wiederholt, 1992: 49). This statement is a clear violation of, at least, two important assumptions concerning the predictive validity of laddering results (Grunert and Grunert, 1995):

- ***The raw data should be a result more of the respondent's cognitive structures and processes than of the researcher's cognitive structures and processes.***
- ***Coding should be preferably based on cognitive categories widely shared among consumers, researchers, and users of research results, and not on the researcher's idiosyncratic cognitive categories.***

As has been noted, critical to the validity of any hierarchical value map derived from laddering data is the ability of the interviewer to obtain the real sequence of an aggregate map of cognitive structure despite the influence of the interviewer on the interview process: "*Understanding the respondent involves putting aside all internal references and biases while putting oneself in the respondent's place*" (Reynolds and Gutman, 1988: 14). This violation of the basic foundations of MEC theory and the laddering approach diminishes the credibility of the Doucette and Wiederholt's (1992) study. Nevertheless, their study presents some interesting findings relating to the dimensions that consumers of pharmaceutical products (i.e., patients) use to evaluate their prescribed medication. Doucette and Wiederholt (1992) argued that "*such information could be used in advertisements and promotions to prescribers and to consumers as long as that information meets Food and Drug Administration regulations*" (Doucette and Wiederholt, 1992: 53).

4.10 The Concept of "Clinical Value"

The purpose of this section is to justify and outline the role of the concept of clinical value and its influence in the research design of this thesis. In doing so, it is intended that the overall configuration of the research and its presentation will clarify the relationships between the conceptual basis/theoretical literature review, as well as the development of methodologies in this thesis (see flowchart/Chapter Two-Figure 2.2: *Study Overview*).

Due to the general lack of empirical investigation into the clinical cognitive apparatus of GPs' prescribing behaviour, the first phase of research is ***inductive*** in nature and aimed at an in-depth understanding of respondents '*real lived clinical experience*' (see **Decision Box 4.1**). That is, a two-stage *qualitative-quantitative* research design was followed and responds to calls for methodological pluralism in understanding the consumer behaviour (see flowchart/Chapter Two-Figure 2.2: *Study Overview*).

4.10.1 The Nature of Values

Despite their importance and prominent place in the scientific and public discourse at a number of levels, *there is a lack of consensus on the nature of values* (Meglino, 1998; Feather, 1995; Rokeach and Ball-Rokeach, 1989). Thus, in this section we will attempt to provide some coherence on the nature of values by:

(a) *discussing what type of values we are talking about;*

(b) *describing what influences a person's value system;*

(c) *reinforcing the stability of values;* and

(d) *questioning whether values are changeable.*

What Type of Values Are We Talking About?

Recent research indicates a lack of consensus on the nature of values:

"*Among other things, values have been considered as needs, personality types, motivations, goals, utilities, attitudes, interests, and nonexistent mental entities*" (Meglino and Ravlin, 1998: 351).

Thus, the first step towards understanding the nature of values is to clarify what type of values we are talking about.

At the most basic level, Rokeach (1973) discriminates between two types of values. One type is the value that an individual places on an object or outcome. Feather (1995) assumes this type of value as valences which refer to the subjective attractiveness or aversiveness of specific objects and events within the immediate situation. As with the valence term used in expectancy models of motivation (e. g., Vroom, 1964), these objects or outcomes acquire value through their instrumental relationship with other objects or outcomes, which, in turn, are instrumental to still other objects or outcomes.

Feather emphasises the goal properties of potential actions and outcomes as perceived by the person at a given moment. Thus, this approach suggests that valences are linked to a specific context and to a present time frame.

A second type of value is more likely to be used to describe a person as opposed to subjective attractiveness or aversiveness of specific objects. These two types of values are often identified using terms such as the value "inherent in an object" and the values "possessed by a person" (see Rokeach, 1973). That is, "*values are properties of persons, they are more abstract and general, and they maintain some stability across a wider time frame*" (Feather, 1995: 1135). Thus, the origin of both types of values (i.e., the value "inherent in an object" and the values "possessed by a person") is within the individual. This *cognitive view* is in line with recent research which indicates a strong correlation between these two types of values such that the values held by a person are assumed to influence the value (s)he places on certain objects or outcomes (Meglino and Ravlin, 1998). The analysis of behaviour in terms of the subjective value of expected outcomes and their consequences has a long history in social behaviour (Bagozzi, 1992; 1982). Behavioural intentions directed at outcomes have sometimes been studied with *the theory of reasoned action*, but as the authors of this well known approach have emphasized, "*it is not applicable to*

outcome or end-state values" (Ajzen and Fishbein, 1980: 29-30; 111). This assumption reinforces the importance of end-state values held by individuals, particularly those that are important for maintaining and enhancing self-esteem: "*All behavior is not guided by values, only that behavior that is related to maintaining and enhancing self-esteem*" (Rokeach, 1973: 14). That is, we will focus on values applied to individuals, as opposed to the values placed on objects or behavioural intentions directed at outcomes described by *the theory of reasoned action* (see Chapter III). Therefore, a deeper understanding of the values held by individuals may provide a better understanding of the value placed on objects or outcomes (Meglino and Ravlin, 1998; Feather, 1995).

Rokeach has provided much of the impetus for research on values possessed by a person, which are modelled by "*culture, society, and its institutions, and personality*" (Rokeach, 1973: 3). However, the researcher's conceptualisation of value "*as an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence*" (ibidem: 5) suggests that values held by individuals can be further subdivided into:

1. *terminal* values; and
2. *instrumental* values.

The former are concerned with preferred end-states of existence (e.g., an exciting life; a comfortable life; a world of peace; national security), while the latter are related to modes of behaviour (e.g., independent; ambitious; cheerful) which are instrumental in achieving the desired end-states.

The Rokeach's (1973) Value Survey (RVS) was designed to measure these two sets of personal values. This functional relationship between instrumental values (i.e., means) and terminal values (i.e., ends) is referred to as a *value system*.

What Influences a Person's Value System?

Having limited our attention to the nature of values, we next consider the influence of both social and culture aspects on a person's value system definition. In this respect, we reflect the views of Rokeach (1973) who maintained that values are also influenced by society and its institutions. Rokeach (1973) accepts that the most frequently evoked reason for similarities and differences in a value system is that they are influenced by personal experiences and exposure to more formal socialization forces. Other researchers also suggest that "*values can be conceived as abstract structures that involve the beliefs that people hold about desirable ways of behaving or about desirable end states. These beliefs transcend specific objects and situations, and they have a normative, or oughtness, quality about them. They have their source in basic human needs and in societal demands*" (Feather, 1995: 1135).

Once developed, a system of values can be defined "*as a person's internalized belief about how he or she should or ought to behave*" (Ravlin, 1995: 598). That is, a person's instrumental values do not necessarily reflect how (s)he wants or desires to behave, but rather, they describe his/her internalised interpretations about socially desirable ways to fulfill his/her needs. This distinction derives from values being partially influenced by culture, as Rokeach (1973) and other researchers also pointed out: "*This is not surprising given that most theorists see values as products of a culture or social system*" (Meglino and Ravlin, 1998: 354). For example, Triandis (1989) suggests that a person's dispositions and behaviours are affected not only by his or her own makeup, but also by the norms and beliefs derived from the cultural environment.

Both in consumer behaviour literature and in psychology more generally, researchers have primarily conceptualised acculturation as imparting a set of general, stable tendencies, akin to personality dispositions. However, this cultural knowledge that drives these tendencies has to be activated:

"*Cultural knowledge comprises many specific knowledge structures – categories, beliefs, decision principles – that exert an influence only when they have been activated or brought to the fore of the mind*" (Briley et al., 2000: 158).

In studies of decision making, a way to evaluate whether cultural knowledge is activated and influences a person's values is by asking

decision makers to provide reasons for their decisions. In this regard, Vinson et al (1977) "*suggest the influence of the socio-cultural, economic, and familial environment on the formation and development of the individual's value system*" (ibidem: 45). Given the abstract nature of human values (Grunert and Muller, 1996), some variance in a person's value system may be explained by differences in individuals' receptivity to these sources of influence.

Are Values More Stable than Attitudes?

Values have been viewed as a "*relatively permanent perceptual framework that shapes and influences the general nature of an individual's behaviour. Values are similar to attitudes, but are more ingrained, permanent, and stable in nature.* (Values are) *closer to ideology or philosophy*" (England, 1967: 54).

Like attitudes, values are social cognitions that facilitate adaptation to one's environment (Kahle, 1983). Values and attitudes differ, however, in that attitudes represent organizations of beliefs around a specific object or situation, whereas values are more abstract in nature (Grunert and Muller, 1996). Furthermore, values were found to be deeper and broader than attitudes and are determinants, rather than components, of those attitudes (McCarty and Shrum, 2000; Homer and Kahle, 1988). After an extensive review of the current attitude-change literature, Olson and Zanna (1993) also concluded that values are potential determinants of attitudes and

preferences. That is, personal values have long been considered by social scientists to be relevant determinants of attitudes and behaviours (Rokeach, 1973).

Feather (1995) suggested that values "*are not only fewer in number than the many specific beliefs and attitudes that people possess*" (ibidem: 1135), but also more stable than attitudes. In a similar vein, Durgee et al. (1996) assume that values are not only more stable than attitudes, but also more important than attitudes in terms of influencing behaviour:

"*Although a person's attitudes and opinions might vary and conflict from time to time and situation to situation, values are felt to be relatively enduring and have stronger effects on behavior*" (ibidem: 91).

Recent efforts to gain a better understanding of helping behaviour and to provide insight into the factors influencing charitable giving also emphasize the stability of values across different cultures:

"*Schwartz (1992) has conducted empirical tests in 20 countries examining values and identifies 10 value types that are consistent across cultures. Two of these value types represent pro-social values of a self-transcending nature: benevolence and universalism*" (Webb et al., 2000: 305).

Using Rokeach's Value Survey, they measured six of the nine values identified by Schwartz (1992) as comprising universalism. Webb and colleagues found a positive relationship between these six values and

attitudes toward helping others. The findings indicate that personalised norms and internalised values are the main sources to donation behaviour, which "*is consistent with the long-standing idea that attitudes are embedded in cognitive structures including beliefs, values, and other attitudes (Scott 1968)*" (ibidem: 301). In addition to understanding the relationship between attitudes and charitable behaviour Webb et al. (2000) also recognise that values are potential determinants of attitudes and preferences.

The previous assumptions not only give values to the capacity for determining attitudes and preferences, but also reaffirm the nature of values as very stable elements with a strong influence on behaviour. This assumption was observed by Lubinski, Schmidt, and Benbow (1996) who studied a sample of gifted adolescents and found that values were remarkably stable over a 20 year time frame. Dominant value orientation either remained unchanged, or moved to an adjacent value. This finding confirms values stability and reinforces the conviction of values as enduring elements tending to form early in life.

Describing goal-content taxonomies, Austin and Vancouver (1996) reinforce the nature of values as consistency elements to guide an individual's behaviour:

"*Higher order goals (e.g., system concepts and values) act in a top-down fashion to drive a certain level of consistency*" (ibidem: 360).

Because values are socially desirable people are "forced" to publicly express and validate these values whether or not they are held internally. Thus, values are commonly regarded as:

"*the link between the individual and society because values help one to know and comprehend the interpersonal world and guide the individual's adaptation to surrounding conditions. That is, values are cognitive representations of various human needs, tempered by societal demands*" (Grunert and Muller, 1996: 170).

In line with this reasoning, values are assumed to be relatively permanent and, consequently, are believed to have substantial influence on the affective and behavioural responses of individuals (see Burgess (1992) for a review).

There is also some indirect evidence in the literature to suggest that the difficulty in changing prior beliefs and preferences derives from values' stability:

"*our findings document the difficulty in changing prior beliefs, even of the pencil-and-paper kind manipulated in our experimental setting. The fact that more than 50 percent of the respondents in experiment 2 did not switch from X-Tel to Crown even after being exposed to strongly argued (preference-inconsistent) information indicates that the resistance to changing one's preferences may be more entrenched than sometimes assumed*" (Jain and Maheswaran, 2000: 169).

Are Values Changeable?

A system of values affects an individual's perceptual processes in that external stimuli are perceived in ways that are consistent with the value structure itself. Thus, this structure reduces social desirability bias because it directly affects behaviour in that it encourages individuals to act in accordance with their system of values (Feather, 1995). A system of values should, therefore, have its greatest impact on the absence of task and situational variables (e.g., incentives, limitations) that affect behaviour in other ways. However, the value structure includes some values that are more important than others:

"*People typically internalize a system of personal values, within which individual values have been prioritized or assigned a relative importance. It is a person's hierarchy of values that determines what activities, interests, and material goods are worth identifying with, cherishing, protecting, acquiring, or consuming. Indirectly, value priorities drive consumption behavior in the marketplace*" (Grunert and Muller, 1996: 170).

That is, individuals learn, through both formal and informal means, to establish a hierarchy of remarkably stable values that guide their product and brand choice. While acknowledging that major longitudinal studies of values have in general showed their remarkable stability, Rokeach and Ball-Rokeach (1989) were able to demonstrate that adult socialisation,

such as that which occurs through the media, or through organizational processes, can in fact change this hierarchy of values in a meaningful way. Feather (1995) also suggests that "*they* (i.e., values) *are relatively stable but not unchanging across the life span*" (ibid: 1135). The same opinion was expressed by Meglino and Ravlin (1998) who reported that "*unlike constructs that are more peripheral to an individual (e.g., attitudes, opinions), values are relatively permanent, although capable of being changed under certain conditions*" (ibid: 354). These assumptions suggest that although remarkably stable, values are not permanent and can be changed under certain conditions.

In line with the reasoning that has been advanced, it is possible to make three main assumptions about the nature of human values:

1. values drive almost every aspect of human behaviour (Rokeach, 1973) and "*values are the ultimate source of choice criteria that drive buying behaviour*" (Claeys et al., 1995: 193);
2. the antecedents of human values can be traced to culture, society and its institutions, and personality (Rokeach, 1973); and
3. Althought the total number of values that any person holds is relatively small, they have a strong endurance and stability. Nevertheless, values can be changed under certain conditions (Feather, 1995; Rokeach and Ball-Rokeach, 1989; Rokeach, 1973).

4.10.2 Value Theory and Doctors' Prescribing Behaviour

In recent years, personal values have gained acceptance as elements of influence in consumer behaviour, psychology and marketing (Grunert and Muller, 1996). With the growing application of the value concept in marketing strategy, "*especially in segmentation efforts, ever increasing numbers of marketers are keen to collect data on their target consumers' values and to apply this information to advertising, product design, and positioning decisions*" (ibid: 169). In a consumer behaviour context, personal values have been researched extensively and cross-nationally for about two decades and found to be relevant for a number of consumption related behaviours - though often in an indirect way. Examples are product ownership (Cheron and Muller, 1993), environmental concerns (Grunert and Juhl, 1991), touristic preferences (Muller, 1991), gift-giving behaviour (Grunert and Wagner, 1989), criteria used for brand choice (Pitts and Woodside, 1983), media usage (Becker and Conner, 1981), and choice of leisure activities (Jackson, 1974). While a great deal of research has examined how values held by individuals affect their behavioural orientations (Schwartz, 1992), value research has not been extrapolated to the area of drug choice. Pharmaceutical manufacturers have long acknowledged the importance of attitudes and attitude change in the study of doctors' prescribing behaviour. However, personal values are prototypes from which attitudes,

as well as behaviours, are derived. Even though the marketing literature reflects an emerging interest in the topic (Steenkamp et al., 1999; Grunert and Muller, 1996; Olson, 1995), personal values have not been used to investigate the underlying dimensions of doctors' prescribing behaviour. This is surprising considering the importance typically assigned to the strong relationship between personal values and consumption behaviour (Carlson, 2000; Webb et al., 2000).

4.10.3 Doctors' Clinical Values and Drug Choice

While it seems that personal values of male and female doctors have important implications for medical careers (Neittaanmaki et al., 1999), research on clinical values and the ways in which they influence the prescribing behaviour of GPs who look at and choose therapeutic classes for treating patients is not available. Despite good reasons to expect that this might be the case, ***no empirical evidence exists to support this idea.*** Thus, it is necessary to operationally define the ***nature*** and ***content*** of clinical values in order to understand drug choice. As a result, the purpose of this section is to address these issues. Specially, attention will be focused on:

1. A discussion of the influence of medical training on clinical values and their relationship to prescribing behaviour.
2. To distinguish doctors' personal values from clinical values.

4.10.3.1 Medical Training: A Source of Clinical Values

In the case of values that are relevant to specific social institutions such as medical schools, these primarily occur during the educational process (Satterwhite et al., 2000). Although a detailed description of medical students' socialization is beyond the scope of this research, two main characteristics of this evolutionary process have important implications for understanding the nature of doctors' clinical values:

a) medical students' training

b) medical typologies

At medical school the GP is trained in clinical skills to interpret patient complaints (Ridsdale, 1995). During the doctor-patient encounter a medical routine is developed to clarify the disease. Thus, the doctor-patient dialogue is based on clinical skills which are useful for identifying focal points (i.e., attributes or characteristics of the patient) which predict the development of a specific clinical syndrome:

"*The doctor could decide whether or not a clinical syndrome belongs to a particular category by judging the similarity between the attributes of the patient and the attributes of the category represented in the prototypes*" (Bordage and Zacks, 1984: 416).

From the perspective of the prototype theory, it could be argued that patient attributes/characteristics such as age, sex, and disease are relevant criteria encapsulated within doctors' long-term memory that mould drug choice. That is, the GP's prescribing behaviour must be understood as an individual, clinical, reasoning process through which doctors translate a clinical syndrome into a patient typology in order to develop the therapeutic approach:

"*Shared meanings and assumptions about that which is categorized and various aspects of its environment are embedded in the typology itself. Typologies are used to define experience and may be used as a basis for action toward that and subsequent similar experience. Typologies are more then verbal or mental "boxes" with which to categorize people and events. They consist of meanings and agendas for action*" (Schneider and Conrad, 1981: 211).

One of the chief merits of a typology is parsimony (Bailey, 1994). The doctor who is overwhelmed by tens of clinical focal points can work comfortably with them when they are grouped into a few main types. A related merit is the emphasis on bringing simplicity and order out of complexity and chaos. As a clinical reasoning process, it has its roots in medical training which advocates a coherent and rational sequence of clinical information processing activities to construct the therapeutic decision (Morrell, 1993).

4.10.3.2 From Doctors' Personal Values to Clinical Values

Personal values were found to be important for understanding the foundation of attitudes and behaviours of individuals in organizations and often serve as a way in which individuals integrate personality and regulate behaviour (Carlson, 2000). Furthermore, exposure to the clinical environment may cause medical students to change their values, perhaps without their recognition of that change (Satterwhite et al., 2000). Nevertheless, it is important to distinguish those values that pertain to desirable end states of existence (i.e., private life) from values that guide doctors' prescribing behaviour (i.e., clinical life). This distinction is partially supported by recent research on *private life values* which shed light on the life situation, career and future plans of young doctors and their views on medical education (Neittaanmaki et al., 1999) as well as the ethical development of medical students (Satterwhite et al., 2000). For example, Satterwhite et al.'s study emphasises that medical students have two separate codes of ethics when they are exposed to unethical situations:

"*students' exposure to unethical situations within the clinical environment may motivate them to maintain separate codes of ethics, one personal and one as a physician*" (Satterwhite et al., 2000: 464).

According to Hunt and Vitell (1986), ethical decision making is influenced by two major moral philosophies – deontology and teleology. The former focus on the specific actions or behaviours of an individual, whereas the latter focus on the consequences of the actions or behaviours.

With this distinction in mind, we are only interested in pharmacological codes of ethics that derive from medical students' training and/or clinical experience. A pharmacological code of ethics is based on deontological norms or guidelines that represent personal values or rules of behaviour: "*one's deontological evaluation is a process wherein one evaluates the inherent rightness or wrongness of an evoked set of alternatives that he/she views as possible courses of action; this evaluation process involves comparing possible behaviors with a set of predetermined deontological norms or guidelines that represent personal values or rules of behavior*" (ibid: 6).

Medical students become doctors only if they acquire the personal values that represent the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individuals patients:

"*Doctors acquire norms and values, not only from their family and social background, but also from their training. An individual entering medical school, or indeed general practice, is sensitive to the particular values and norms that exist in a new setting and gradually adapts so that he comes to think as, act as, and indeed 'is a doctor'* " (Pendleton et al., 1996: 6).

Ridsdale (1995) believes that doctors have a pharmacological code of ethics that enable them to define the best therapeutic approach for their patients. A pharmacological code of ethics embraces an evoked set of therapeutic alternatives which are important for GPs who have "*to question their clinical practice systematically and, where shortcomings are identified, change that practice in line with scientifically valid evidence*" (Tomlin, 1999: 2). This evaluation process involves comparing possible therapeutic solutions with a set of medical guidelines that represent criteria for drug choice. Surprisingly, little attention has been focused on the clinical values or criteria which represent the scientific aspects of drug choice.

4.10.4 The Nature of Clinical Values

A long shared medical training ensures medical students and doctors will, to a large extent, share the same clinical criteria in dealing with specific diseases (Norton and Smith, 1994). Unfortunately, prescribing behaviour, the final and visible part of this clinical criteria, has been found to vary widely (McInnes, 2000). This reality has "*stimulated the publication of guidelines to assist practitioners in the management of hypertension*" (McInnes, 2000: 28). As a pharmacological code of ethics, these medical guidelines embrace homogeneous clinical values that may provide a powerful basis for understanding drug choice.

Medical care in general, and prescribing in particular, is an extensive problem solving activity that requires special clinical skills (Pendelton et al., 1996).

As we shall repeatedly see in the sections that follow, medical problem solving proceeds by selecting clinical values as a vehicle by which drug choice becomes easier. In line with this reasoning, we move from organizational values (i.e., medical school or health authorities) to individual clinical values (i.e., GPs' therapeutic decisions). This approach represents how a GP gradually adapts so that he or she comes to think as and act as a doctor in terms of prescribing behaviour. In other words, a pharmacological code of ethics is a medically created reality that makes GPs understand the degree to which they are "prisoners" of the medical ideology in which they were brought up.

The previous assumptions confirm Rokeach's (1973) conviction that the adoption of value systems derives from culture, society, and its institutions. Thus, the medical culture, derived from the medical society and its institutions, is assumed to be an important source of clinical values.

Values provide guidelines for individuals' behaviour. While psychology and consumer research have used 'values' in terms of *preferential judgements* in their applications of the expectancy-value or multi-attribute models, in this research we use Rokeach's (1973) definition of '***values***'

that refer to the "***criteria***" by which such *preferential judgements* are made. This is consistent with Rokeach's work which found that *values-as-criterion* are stable entities that are highly resistant to change because they represent *terminal values*.

If we have stable criteria for the choice of a therapeutic category, we also have stable and highly resistant to change choices in terms of therapeutic classes.

The advantages of studying ***values-as-criterion***, Rokeach (1973) argues:

"*we would be dealing with a concept that is more central, more dynamic, more economical, a concept that would invite more enthusiastic interdisciplinary collaboration*" (ibidem: 5). For these reasons, Rokeach's (1973) vision of values-as-criterion will shape the conceptualisation of clinical values:

clinical values are general criteria that are developed by GPs, through the medical educational process, which influence the selection of a therapeutic class, with specific therapeutic attributes, which in turn are instrumental in helping them achieve their desired clinical consequences.

The ***hierarchical nature*** of clinical values and clinical consequences that can be linked to product attributes, is based on five fundamental assumptions:

1. *clinical values are doctors' enduring beliefs or general criteria;*
2. *about desirable selection of specific therapeutic classes in order to improve the therapeutic benefits for the patient;*
3. *that transcend specific clinical situations;*
4. *the antecedents of clinical values can be traced to medical education and general practice (i.e., clinical experience); and*
5. *although the relationship between clinical values and the selection of specific therapeutic classes can be changed under certain conditions, it is highly resistant to change because this relationship derives from medical students' training and/or clinical experience.*

The influence of *clinical values* on prescribing decision-making has not been analysed by the theoretical works in the drug choice literature. However, *clinical values* approach *needs an infusion of theory* to give it a broader perspective *in linking product choice to clinical values.* As a result, the most representative value models have to guide this reflection.

4.11 Personal Values Research

4.11.1 Rokeach's (1973) Value Survey (RVS)

Although it is sometimes difficult to identify one scholarly piece of work as the seminal work for an area of inquiry, it is relatively easy to do this with individual values. As Feather (1995) noted, most research on personal values derives from the seminal contributions of Rokeach (1968; 1973; 1979). Milton Rokeach's work from the late 1960s and early 1970s holds the distinction of being the work most used by later research. Subsequent research uses the work of Rokeach to define the conditions and meaning of values, to provide insight into the empirical examination of values, and as a way of measuring values. That is, one of the most commonly researched value inventories is the Rokeach Value Survey. Thus, in discussing the values measuring instruments reported herein, we follow mostly the social-psychological conceptualisation of the term "value", and in particular Rokeach's view. Furthermore, the most important general value scales that have been used in the last decade (e.g., Schwartz, 1992; Feather, 1995) were derived scales that were based on the Rokeach Value Survey (RVS).

The RVS uses ordinal scales to measure 18 terminal and 18 instrumental values, which are alphabetically listed on two separate pages. Then, respondents are invited to rank order each value as to its importance as a guiding principle in living their life. A "1" indicates the most important

value and a "18" the least important. But, of course, the problem with Rokeach's scale is that it asks participants to rank-order their values, as argued earlier, that results not only in statistical difficulties, but also in respondent difficulties. That is, the Rokeach's original ranking procedure presents difficulties both for researchers and respondents. Furthermore, Rokeach's interest in values has not led to his developing mechanisms for translating instrumental values into choices of objects to satisfy those values.

4.11.2 Schwartz's (1992) Value Survey

Probably the most important programmatic stream of research on personal values in the past decade has been conducted by Schwartz and colleagues (e.g., Schwartz, 1992; Schwartz and Sagiv, 1995). Building on and extending Rokeach's (1973) work, values have been defined as "*desirable trans-situational goals, varying in importance, that serve as guiding principles in the life of a person or other social entity*" (Schwartz, 1994: 21). Values, then, are responsible for the selection and maintenance of the ends or goals towards which human beings strive and, at the same time, regulate the methods and manner in which this striving takes place. As such, the measurement of personal values provides an indication of the motivating factors in a person's life.

Schwartz (1992) developed a new value measurement instrument which derives from previous research on the content and structure of values initially presented by Schwartz and Bilsky (1987; 1990).

Schwartz and Bilsky encapsulated many of the features mentioned by Rokeach (1973) into their definition of values; in addition, they developed new ideas about the structure and content of values, deriving them from a theoretical consideration of the three basic requirements that were assumed to preexist in all individuals – namely, "*to satisfy biological needs, to achieve coordinated social interaction,* and *to meet social institutional demands for group welfare and survival*" (Schwartz and Bilsky 1987; 1990).

They proposed that there were eight motivational types of values that could be derived from the three universal human requirements. The crucial aspect that distinguishes among values is the type of motivational goals they express.

Schwartz and Bilsky also specified sets of dynamic relations between the values types on the assumption that the actions taken in pursuit of different value types may come into conflict, or be compatible, with each other. For example, actions expressing conformity values may be in conflict with actions that expressed self-direction values, but they may be compatible with actions that expressed security values. Schwartz and Bilsky (1987; 1990) found support for their ideas in cross-cultural studies that used the

RVS to investigate the structure of relations. Subsequently, Schwartz (1992) developed this analysis further by expanding the number of value types, by sharpening some of the definitions of these values types, and by specifying the content of the larger classification of value types in terms of the sets of values that comprised them.

The new Schwartz Value Survey, which has been used in crosscultural studies of work values (Ralston et al., 1997; Schwartz, 1994; Schwartz and Bilsky, 1990), embraces 10 value types, which enclose 56 values covering a wide range of content. These items were measured with a nine-point scale, ranging from "*opposed to my values* (-1)" to "*of supreme importance* (7)". The ten value types emerged from smallest-space analysis (Gutman, 1968) applied to ratings obtained for the 56 values in the Schwartz Value Survey from student and teacher samples in 20 different countries (Schwartz, 1992).

The value types proposed by Schwartz (1992) were *power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, conformity, tradition and security*. These personal value types were discussed in relation not only to the three universal human requirements that are assumed to preexist in all individuals, but also to the motivational goals that they express. Thus, the ten motivationally distinct types of values described above reflect a continuum of related motivations. It gives rise to a circular structure that

captures the notion that the pursuit of different value types can be compatible or in conflict, depending on how close the value types are. For example, stimulation and self-direction are situated next to each other. The simultaneous pursuit of these value types is compatible because both involve intrinsic motivation for mastery and openness to change. Conversely, stimulation is located opposite conformity and tradition, as the former emphasizes challenge, risk, and change, whereas the latter favours self-restriction and preservation of the status quo.

As Schwartz (1992) noted, simultaneous pursuit of both groups of value types would give rise to psychological and social conflict. That is, the analysis yielded a circular structure of wedges in which some value types were adjacent to each other in the circle (e.g., power and achievement), whereas others were on opposite sides of the circular map (e.g., self-direction and security). For example, the motivational goal of power was assumed to involve social status and prestige and control or dominance over people and resources; the motivational goal of security was assumed to involve safety, harmony and stability of society, of relationships, and of self.

Schwartz pointed out that the ten value types are organised in four higher order value domains that form two basic bipolar dimensions: *openness to change* versus *conservation* and *self-transcendence* versus *self-enhancement*.

These two bipolar dimensions constitute the most fundamental aspect of the Schwartz value system (Schwartz and Sagiv, 1995). The former arrays "*values in terms of the extent to which they motivate people to follow their own intellectual and emotional interests in unpredictable and uncertain directions versus to preserve the status quo and the certainty it provides in relationships with close others, institutions, and traditions*" (Schwartz, 1992: 43).

An index of the importance of a value domain was obtained by computing the mean importance for each value type separately, and subsequently averaging the importance attributed to the value types within each domain. This procedure ensures equal weighting of all value types in the construction of a particular value domain (Schwartz, 1992).

4.11.3 Feather's (1995) Values Types

The structure and content of Schwartz's value system has received impressive empirical support in research, particularly from other researchers who have tested his model. For example, Feather's (1995) study on the influence of values on the perceived attractiveness and choice of alternatives contrasts the use of circumplex models (Johnson and Ostendorf, 1993) adopted the circular value structure presented by Schwartz (1992). Feather (1995) suggested that the former is particularly important in describing the structure of personality traits which are distinct from, but related to, values (see Blisky and Schwartz, 1994). That is,

circumplex models are closer to Rokeach's instrumental values, while the circular value structure is mainly concerned with terminal values:

"*Some of the trait-descriptive terms used in these analysis are similar to the specific value terms involved in the Rokeach Value Survey (Rokeach, 1973) and the Schwartz Value Survey (Schwartz, 1992), but more so in relation to values that relate to the importance of instrumental behaviors, such as being ambitious, forgiving, responsible, and obedient, than for abstract terminal values that refer to general goals*" (ibidem: 1137).

The response measures for the circular value approach (Schwartz, 1992) also differ from those used in the measurement of personality traits in that the emphasis in value measurement is on the importance of each value for the self as a guiding principle in a person's life rather than on self-descriptions that refer to consistent modes of behaviour. Thus, the circular value approach is assumed to have an explicit motivational basis, given that values express motivational goals that are more similar for adjacent value types. In contrast, the circumplex structures of personality traits that have been proposed are not usually related to motivational concerns. Furthermore, the circular value structure captures the notion that the pursuit of different value types can be compatible or in conflict depending on how close together the values types are on the circular map. Feather pointed out that circumplex models of personality traits do not consider

compatibilities and conflicts in trait-related behaviours. Furthermore, Feather (1995) does not limit the effect of values to cognitive choices in structured ego-involving situations: "*Values also have long-term effects on a person's behavior, functioning to influence both the short-term and long-term goals that become salient for a person and the selection of plans and actions that relate to these goals. In that sense they have a motivational role...They influence a person's cognitive-affective appraisal of a situation in relation to both means and ends*" (ibidem: 1136). Thus, behaviours and their possible outcomes become linked to the cognitive-affective system via a person's dominant values. Thus, the person's perception of the attractiveness or aversiveness of alternative behaviours or potential outcomes would depend in part on the values that the person deems to be important for self. In line with this reasoning, these value-induced valences would be expected to influence the choices that a person makes between alternatives in a given situation. Consistent with the general framework of expectancy-value theory, Feather (1995) assumes that a person's choice between alternatives would be influenced by his or her valences or subjective values and by expectations that the person holds: "*The assumption that values may induce valences on potential actions and their possible outcomes has important consequences for motivational theory because it enables one to bridge the gap between values and actions by using the general framework of expectancy-value theory*" (ibidem: 1148).

The participants in Feather's study were 239 university students who answered a questionnaire that contained the Schwartz Value Survey[12], different hypothetical scenarios and standard demographic items such as age and gender. For each scenario (ten hypothetical scenarios were designed that described situations that could be assumed to engage particular sets of values), participants provided ratings of valence or attractiveness for each alternative and then indicated which alternative they would choose if they were in that situation. These measures were related to participants' scores on the value types and higher order dimensions that were based on their responses to the Schwartz Value Survey (Schwartz, 1992).

Feather's (1995) research and Schwartz's (1992) study have influenced recent reflection in the context of consumer innovativeness. Based on these theoretical frameworks, Steenkamp et al. (1999) developed a new conceptual scheme to evaluate the effects of personal values, consumer-context-specific dispositions, and national culture in 11 European Union countries. Both value orientations and secondary, consumer-context-specific dispositions exerted significant effects on consumer

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[12] This survey consists of 56 values. Each value is accompained by a short descriptive phrase, and participants used a 9-point rating scale numbered from –1 to 7 to rate how important each value was as "a guiding principle in your life". The rating scale was labeled as follows: -1 (opposed to my values), 0 (not important), 3 (important), 6 (very important), and 7 (of supreme importance).

innovativeness. These researchers also found that national cultural variables were relevant in explaining systematic differences in innovativeness between countries. Steenkamp et al.'s (1999) findings are important because they "*demonstrate that innovation orientation differs not only among consumers, but also among countries*" (ibidem: 64). If a company decides to introduce a new product in countries whose national culture is less conducive to fostering innovativeness in its citizens, the marketing strategy has to be modified in several aspects to increase its effectiveness. Webb et al. (2000) also suggested that personal and cultural values have commonly been associated with the differential behaviour of individuals.

Steenkamp et al.'s (1999) study is one of several attempts that have been made in the last two decades to provide a theoretical and conceptual structure connecting consumers' values to their behaviour.

4.11.4 Kahle's (1983) List of Values (LOV)

Kahle's (1983) list of values (LOV) is another interesting example of a survey approach that establishs a relationship between general values and behaviour. The LOV scale consists of nine parsimonious Rokeach-like terminal values: *excitement, warm relationship with others, being wellrespected, security, sense of belonging, fun and enjoyment in life, self fulfillment, a sense of accomplishment*, and *self-respect*. Each of these values can be scored in a

number of ways. Each value can be rank ordered from most to least important, or the values can be evaluated on 9 or 10 point scales, ranging from very unimportant to very important. A combination of the two methods is also possible where each value is rated on 9 or 10 point scales and then individuals are asked to circle the one or two values that are most important to them in living their daily lives. This value-based survey methodology is important not only for understanding, measuring, and presenting the importance of interpersonal relations in value fulfillment, but also for defining personal factors (i.e., self respect, self-fulfillment), and other factors such as fun, security and excitement in value fulfillment.

In focusing primarily on the product and values related to it, LOV measures those values that are central to people in living their lives, particularly work, leisure and daily consumption.

Exploring the meaning of LOV, Kamakura and Novak's (1992) study suggests that the LOV approach is related to, and predictive of, consumer behaviour and related activities. Using a value system segmentation, Kamakura and Novak identified two segments. The first segment valued *security* and the second valued *warm relationships* and *fun*. The former was relatively risk averse and correspondingly tried fewer new products, while the latter liked outdoor activities, leisure products, and preferred television sitcoms over religious and news programs.

4.11.5 Mitchell's (1983) Values and Lifestyle Typology (VALS)

The values and lifestyle typology (VALS[13]) (Mitchell, 1983) method essentially created *a priori* categories based on Maslow's (1954) hierarchy of needs and the concept of social character and then developed a set of statements (and a scoring system) that permitted classification of respondents into those categories. The original VALS survey encapsulates a set of 40 attitude statements scored on a 6-point "disagree strongly" "agree strongly" basis, and 15 more questions assessing different perspectives on politics, finances, job satisfaction and the like.

In addition, the VALS program presents a number of demographic, media habits, activities, financial issues, household inventory, and product usage questions that permitted the classification of American adults into nine typologies. Some researchers suggest that VALS and LOV models "*are silent about how information is processed and organized. Related to this is their neglect of the underlying structure of information and whether beliefs or values are related in hierarchical, functional, or inferential manners*" (Bagozzi and Dholakia, 1999: 22). Identical opinion was expressed by Durgee et al. (1996) who developed a new methodology to identify core life values and their influence on consumer behaviour.

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[13] Though several well known value-based survey methodologies were reported, the prototypical example of this approach on a total population basis is the VALS Program developed and marketed by Stanford Research Institute (SRI) (Bearden et al., 1993).

4.11.6 Durgee et al.'s (1996) List of Values

Durgee et al. (1996) believe that a classification scheme such as VALS may be useful for developing marketing strategy and predicting consumer behaviour. However, VALS and other value-based survey methodologies such as Kamakura and Novak's (1992) research "*identify associations between values and products which may or may not be causal. They are merely associations*" (ibid: 91). To overcome this problem, a new methodology was described for identifying core life values and tracing their direct impact on consumption. Durgee et al.'s (1996) list of values represents a combination of values from the Rokeach and LOV value surveys. In the first step, respondents were presented with a combination of values from the Rokeach and other value surveys such as Kahle's (1983) list of 9 values (LOV) and asked individually to indicate which five values were most important in his/her life. In the next step, five products from many different categories were selected to make each of the five selected values possible. Finally, respondents were invited to explain the intermediate reasons or "means" between *end values* and *products*. The nature of this approach is a "means-ends" product value chain which begins with core target values (i.e., ends) and causally relates them to actual product use (i.e., means). In other words, Durgee et al.'s (1996) means-end chain seeks to explain how a product selection links values to behaviour.

4.11.7 Vinson et al.'s (1977) Means-End Chain Model

Vinson et al.'s (1977) model is another means-end chain model that assumes values as "*centrally held cognitive elements which stimulate motivation for behavioral response*" (ibidem: 49). Their vision to the consumer's value-attitude system derives from Rokeach's (1973) Value Survey. That is, based on the difficulty respondents have had in ranking all Rokeach's 18 terminal and 18 instrumental values, Vinson et al. (1977) have attempted to create three levels of abstraction, arranged in a hierarchical network. The model begins with global values (a redefinition of terminal values) at the most central level (closest to a person's self-concept) and causally relates them to domain-specific values. With this cognitive view, they were able to establish an hierarchy that links global values to domain-specific values. This intermediate level bridges the contact with evaluative beliefs about product attributes (e.g., beliefs used in expectancy-value research), the least central level. As a result, values "*exist in an interconnected hierarchical structure in which global values are related and connected to generalized consumption-related values, which are, in turn, similarly associated with product attributes*" (ibidem: 49):

- *Global or generalised personal values*: centrally held and enduring beliefs which guide actions and judgements across specific situations.

- *Domain-specific values*: individuals acquire values through experiences in specific situations. As a result, behaviour can only be understood or efficiently predicted in the context of a specific environment.

- *Evaluation of product attributes*: descriptive and evaluative beliefs such as the desirable attributes of product classes. It is this less centrally held level of values that most of the expectancy-value research has used in predicting brand appeal.

This work suggests that "*value acquisition represents a socio-cultural process and that differential value orientations will lead to variations in preferences for products and brands*" (ibidem: 46). In order to test the proposition that values are culturally and socially learned, an exploratory study was undertaken to investigate whether subjects from two culturally distinct regions of the United States would manifest different value orientations; and, if so, the extent to which these value differences may be related to attitudes toward automobiles and the importance of automobile attributes.

Subjects used in the research were selected from a sample of undergraduate marketing students at two different state universities (liberal and traditional universities). Each group was administered an identical questionnaire, which included a number of seven point Likert-type scales designed to measure the importance of the Rokeach global values and

specific consumption-related values. In addition, data were also collected on the importance of 20 automobile attributes, and the appeal of 10 consumer products and services. Attitudes toward a number of current social issues were also collected to further explore attitudinal differences between the two groups. The results indicated that the two groups of marketing students were significantly different with respect to their basic value orientations. These differences were consistent with preference for the consumer products or services as well as for the perceived importance of the selected social issues.

Gutman (1982) noted that Vinson et al.'s (1977) model has fallen short of meeting the criteria of specifying the links in their means-end chain:

"*although various levels of a means-end chain are articulated, no means are provided by which values at global and domain-specific levels are related to each other nor how either level of values is tied to evaluations of product attributes*" (ibidem: 64).

4.11.8 Howard's (1989) Consumer Value Model (CVM)

Howard (1989) incorporated many of the features mentioned by Rokeach (1973) into his definition of values. This applies to Rokeach's (1973) battery of 18 "terminal" and 18 "instrumental" values.

These individual values, which have been found to be important criteria for influencing evaluations or choices regarding persons, objects, and ideas, were used in marketing/consumer research (Bearden et al., 1993). One of the most important examples is Howard's (1989) consumer value model (CVM).

The CVM, in its "extensive problem-solving" version is a theoretical and conceptual structure connecting consumers' value systems to their behaviour. This model suggests a hierarchical evaluative structure having two different levels, one headed by terminal values and one headed by instrumental values:

Terminal Values	choice criteria for product class	belief about product class	attitude toward product class
Instrumental Values	choice criteria for brand	belief about brand	attitude toward brand

Terminal and instrumental values are defined in the same way that Rokeach defines them:

"*terminal values are the more general personal values referring to end-states of existence, for example, a comfortable life, an exciting life*" (Howard, 1989: 56), while "*instrumental values that are less general, more specific personal values referring to modes of behavior such as ambitious, loving, and so on*" (ibidem: 56).

In his model "choice criteria" refer to benefits, and "belief" "*refers to where the consumer "believes" a brand is located on those respective benefits*" (ibid: 56).

After considering the benefits, consumers form attitudes, and their attitudes lead to decisions of whether or not to purchase a particular product category or class (i.e., first level of choice). In other words, the choice of a product category is believed to be initiated by general personal values, which provide choice criteria for a product category. Beliefs about each of a set of product classes lead to a decision to make a purchase from a particular product class. From this product category, and following the same reasoning, a specific brand is chosen (i.e., second level of choice). Such reasoning strengthens the argument that

"*terminal values determine choice at the product class level but instrumental values at the brand choice level*" (ibidem: 58).

Howard pointed out that the major reason for this two-level choice structure is that consumers are making choices across categories of products. For example, a successful pharmaceutical manufacturer should

help the doctor to group a new brand into the appropriate category and to distinguish it from other brands in that category. Unless the doctor can put the new pharmaceutical brand into a category in his/her mind, s(he) is less likely to prescribe it. If the manufacturer's information is not clear enough, the company could lose a prospective prescriber who is too busy to use the time and effort required to learn about the product category. Thus, Howard's two-level choice model implies that the analysis across products are the most important step "*to understand those fundamental consumer changes that open opportunities for product innovations that are so crucial to marketing success in industrially advanced countries*" (ibid: 58).

Despite featuring terminal values as initial motivations for product choice Howard does not specify whether these general personal values are stable in different situational contexts. There are reasons to believe, however, that only a limited number of general values will be activated in any particular choice situation, and that which and how many terminal values will become salient depends on the nature of the problem. Furthemore,

"*Howard (1989) does not specify how these values are organized and how they function to influence attitudes, decisions, and choice*" (Bagozzi, 1999: 22).

4. 12 Problems with Measuring Instruments

There have been many values instruments developed over the years. There are also many views on how values can best be measured (McCarty and Shrum, 2000; Finegan, 2000; Rallapalli et al, 2000; Meglino and Ravlin, 1998; Oliver, 1999; Agle and Caldwell, 1999; Grunert and Muller, 1996; Feather, 1995; Howard (1977; 1989); Kahle, 1983; Mitchell, 1983; Rokeach, 1973). One of the main problems recognised by many researchers, but rarely dealt with in practice, is the question of whether and how values and their influence on behaviour can be verbalised and thus made accessible for measurement. In addition to this main problem, values have been conceptualized in different ways (Meglino and Ravlin, 1998; Rokeach and Ball-Rokeach, 1989), ranging from personality types to needs, attitudes or even higher order goals to life role values (Carlson, 2000; Austin and Vancouver, 1996; Feather, 1995). For example, Carlson argues that life role values are the system of values an individual holds because he or she believes them to be important to, central to, or a priority in his or her life. Thus, values are a desirable state of existence, not necessarily a reality. This remains an open empirical question: "*How are consumers prioritizing their values when asked to do so by value researchers? Are they thinking "ideal" life or are they thinking "real" life, i.e., subject to the realities and demands of everyday life? Hence, this distinction between "real" and "ideal"*

values presents a methodological problem for any consumer researcher using the concept of values" (Grunert and Muller, 1996: 171). Furthermore, the respondent's hierarchy of values has to be determined to know whether is possible to assume some of them as main causes of consumption behaviour in the market place. Unfortunately, researchers have advanced two distinct values measuring instruments (McCarty and Shrum, 2000). This may help to explain why some studies have generally shown modest relationships between personal values and the behaviours of interest: "*Although it may be that the paucity of strong and consistent findings is simply because the relationship between values and behavior is tenuous, it may just well be that the relatively weak findings are attributable to problems with the measurement of values*" (McCarty and Shrum, 2000: 272). This debate centres on whether a respondent who is presented with a set of values should be obliged to rank them from most to least important, or to rate a set of items, or statements describing a value or a set of values, on an importance scale. In summary, it would be possible to argue that:

1. there is a lack of consensus on the *nature of values* themselves; and
2. value measuring instruments may cause a bias in the finding. As a result, "*value researchers are divided on the appropriate way to measure values*" (Meglino and Ravlin, 1998: 358). Some of them prefer to use ipsative measuring techniques, while others suggest the use of normative measuring techniques.

4.12.1 Ipsative Measuring Techniques

As pointed out earlier, the tricky issue of how survey respondents understand and evaluate the value rating or ranking task has not been properly resolved. The main explanation for this derives from how these researchers conceptualise the nature of values themselves: "*obtaining unambiguous value priority data from consumer surveys is a tricky task, given the abstract nature of human values*" (Grunert and Muller, 1996: 171). Because personal values are relatively abstract concepts, measuring them has proven to be a difficult task. Those who believe that values are less than totally conscious, somewhat below an individual's level of complete awareness (Meglino and Ravlin, 1998; Rokeach, 1985; 1973), prefer to use methods that oblige respondents to rank order a set of values. As a result, this method assumes that accurate value measurement requires assessments made in choice situations. Therefore, ipsative scores are believed to more closely represent an individual's true values, rather than his or her public endorsements of socially desirable statements. Furthermore, many researchers maintain that values are hierarchically structured based on their relative importance to an individual. Because ipsative methodologies ultimately yield a rank ordering of values based on importance, they are believed to duplicate the way values are cognitively held by individuals (Meglino and Ravlin, 1998).

4.12.2 Normative Measuring Techniques

Value researchers from the Stanford Research Institute (SRI) and others (Grunert and Muller, 1996; Feather, 1995; Schwartz, 1992) prefer to measure values independently of each other using values scores. As a result, they argue that "normative" techniques are able to define a respondent's value profile in accordance with the way (s)he rates a set of items or statements describing a value or a set of values (Feather, 1995). This is impossible using ipsative procedures because each value must be assigned a different rank. Furthermore, the SRI method and its VALS Program assumes that when values are rated independently, it is possible to capture absolute differences between values. Therefore, researchers are able to compare the strength of various values across individuals. This information is unavailable when values are ranked. Similarly, normative procedures also allow for values to be rated as equal in strength, which is not possible with ipsative measures: "*ranking procedures may force distinctions between values when none exist, whereas ratings allow for ties*" (McCarty and Shrum, 2000: 272). Furthermore, a ranking procedure is more difficult to administer than a rating task because it requires a great deal of time and energy for respondents to complete, particularly when the number of items to be ranked is more than four or five (Reynolds and Jolly, 1980).

This set of advantages of normative techniques over ipsative methods also permits the use of more sophisticated statistical analysis. Normative proponents also note that ratings are less cumbersome than rankings, making a normative format more convenient to administer. They argue that ranking procedures are extremely difficult to administer using telephone survey methods. Moreover, the ordinal nature of ranked data imposes the use of nonparametric statistics. Rokeach and Ball-Rokeach (1989) stressed that some researchers prefer to use normative measurement techniques simply because these techniques are more convenient from a statistical point of view. However, measurement problems with ipsative and normative techniques can not be reduced only to statistical problems. In this respect, we agree with researchers who maintain that allowing statistical issues to dictate methods of value measurement amounts to "*putting the methodological 'cart' before the theoretical 'horse'* " (Rokeach and Ball-Rokeach, 1989: 775). Thus, we believe that the theoretical relevance that derives from different paradigms should take precedence over statistical convenience in such studies. This means that the problem has to be analysed according to two different theoretically-grounded perspectives:

1. ***the Macro Approach***; and

2. ***the Micro Approach***.

4.13 Macro VS. Micro Value Research Methodologies

Personal values research in marketing and consumer behaviour has received a substantial amount of attention from both academics and practitioners (Durgee et al., 1996; Walker and Olson, 1991; Howard, 1989; Reynolds and Gutman, 1988; Reynolds, 1985; Gutman, 1984; 1982). However, the application of value theory and research to marketing problems has taken two theoretically-grounded perspectives:

1. The "**macro**" approach, grounded in sociology and survey research methodology, has been able to develop a classification scheme to categorize respondents into predetermined groups defined by value orientation.

"**Macro**" value approaches such as RVA, VALS, LOV models and their derivatives provide interesting representations of a "means-end" product value chain. As a result, it is possible to argue that the value items on these inventories are, themselves, well grounded in theory. Furthermore, the empirical work indicates that their advantages lie in their simplicity, ease of operationalisation, and usefulness in prediction. That is, not only value survey approaches present a robust theoretical framework, but also their empirical research brought new blocks of knowledge to consumer behaviour and marketing action. These empirical generalizations may be seen as important contributions for science:

"*Science is a process in which data and theory interact leading to generalized explanations of disparate types of phenomena. Thus, empirical generalizations are the building blocks of science*" (Bass and Wind, 1995: G1). Nevertheless, the "macro" survey approach presents some problems that should be highlighted.

Reynolds (1985) argued that the "**macro**" methodological approach is based on several key assumptions, "*the most important being that respondents can, in fact, deal with value orientations and the statements that reflect such highly personal meanings*" (ibidem: 298). The different value surveys described earlier assume that values being measured represent the dimensions upon which individuals actually base their assessment. As Grunert and Muller (1996) noted, the relationship between "real" and "ideal" life value measures and other aspects of consumption behaviour that are driven by value priorities indicate the possibility of wrong connections between values and some predicted behaviour: "*Our finding tentatively signals that the measurement problem in value surveys can lead to faulty conclusions by marketing managers who wish to apply value data to marketing decisions such as product design, segmentation, and the refinement of marketing communications. And we believe that our finding is just the tip of a methodological iceberg*" (ibidem: 179). As a result, their primary disadvantage rests in the limited way they accomplish an explanation and understanding of consumer behaviour.

Two other implicit assumptions derive from the central and explicit assumptions:

- respondents are engaged with these personal motivations;
- respondents are assumed to respond accurately.

From experience, researchers are aware that is extremely difficult in a survey context to test assumptions such as these; hence, they are "taken on faith" (Bagozzi, 1999). Furthermore, McCarty and Shrum (2000) pointed out that "*cognitively sophisticated respondents are more motivated than those with less sophistication, and this motivation influences differention regardless of the rating instructions with which they are presented*" (ibid: 275). In other words, unmotivated respondents tend not to make distinctions and thus do not differentiate greatly among the items they evaluate.

In terms of statistical problems that derives from this positivist approach, three other problems should be listed:

- Whether the instrument should have individuals rate or rank values. The type of data acquired from rankings is ipsative in nature, meaning that the information gathered is the relative judgement of one value against another. For this reason, items cannot be eliminated or added without substantially altering the integrity of the scale. This is a problem because the information gathered on the value is only relative, and the knowledge about the absolute

strength of the value is not gathered (Braithwaite and Scott, 1991). This also makes the statistical analysis awkward. However, absolute ratings are also problematic. Because values are often perceived as socially acceptable and desirable, individuals may tend to use the extreme positive categories on a rating scale. This leads to a skewed distribution, which also creates statistical analysis problems.

- Whether a value should be measured by one item or multiple items. Rokeach (1973) pointed out that one item, that is well-defined, is enough and that multiple items would lengthen and complicate the measurement procedure. Others argue that a value should be measured by multi items to increase the reliability and validity of the scale (Meglino and Ravlino, 1998). Single item measures also are particularly problematic when making cross cultural comparisons (Braithwaite and Scott, 1991).

- Whether values should be evaluated alone or in comparison to others. This third problem is related to the first two. As previously noted, a system of values encapsulates a hierarchy of values and some of them have a high importance. However, what happens when individuals have to make a choice between two values that are extremely important?

All these problems using the "**macro** theoretical framework" to value measurement were recognised recently: "*Despite decades of research on values, and numerous studies comparing normative and ipsative measurement techniques, there appears to be no clear resolution to the value measurement controversy. We believe that this conflict, and perhaps its resolution, is linked to differences in the way individuals process information under various circumstances. Specifically, there appear to be times when an individual's cognitive processes are naturally focused on creating a rank ordering...On the other hand, there appear to be occasions when an individual's cognitive processes are primarily focused on making absolute discriminations on independent dimensions*" (Meglino and Ravlin, 1998: 360). This contingency approach suggests a phenomenological measurement methodology which appears to be more correct because it closely mirrors the actual cognitive process engaged in by respondents.

Regardless of which method represents the better approach to measuring personal values, it is possible to argue that most attempts that have been made to provide a theoretical and conceptual structure connecting consumers' values to their behaviour have their origin in the Rokeach's (1973) Value Survey. However, Jones et al.'s (1978) study has shown that only one-third of Rokeach's Values are among the spontaneously mentioned values. This clearly suggests that *respondents should be allowed to express their own values rather than scoring (or ranking) predetermined values*.

2. The "**micro**" methodology, based on **cognitive psychology**, prefers to ask consumers to describe their feelings about products in such a way that ultimate values come out.

The "**micro**" methodology recognises that subjects should be allowed to express their own values because "*values provide the overall direction, consequences select specific behaviors in specific situations, and attributes are what is in the actual products that produce the consequences*" (Gutman, 1984: 25). Gutman uses "*a model that seeks to explain how a product or service selection facilitates the achievement of desired end states. Such a model consists of elements that represent the major consumer processes that link values to behavior*" (ibid: 60).

As Gutman (1982) noted, "*the nature of the various means-end chain appearing in the literature is a function of the perspectives of their authors*" (ibidem: 64). Gutman's means-end approach differ from Howard's (1977; 1989) two-level choice structure in that the concept of instrumental values is not used:

"*there is only one chain as opposed to hypothesizing parallel semantic and evaluative chains. Value and consequence level categories subsume grouping level categories, creating a single hierarchy of categories across all levels of the means-end chain*" (ibid: 64).

This single hierarchy of categories across all levels of the means-end chain is a system whose inputs "*are products and situations; outputs are products chosen for final consideration*" (ibid: 65). That is, "*products can also be interpreted as value satisfiers. These personal values are therefore important life goals that consumers are trying to achieve (e.g., happiness, security, wisdom) which may, in certain instances, be linked to the products or services consumed by the individual*" (Baker, 1992: 662). Thus, the "**micro**" approach "*especially focuses on the linkages between the attributes that exist in products, the consequences for the consumer provided by the attributes, and the personal values the consequences reinforce*" (Valette-Florence and Rapacchi, 1991: 30).

In line with the reasoning that has been advanced, the "**micro**" approach suggests that establishing the personal relevance of a product should be a primary objective of marketing managers: "*To develop effective marketing strategies that build personal relevance, marketing managers need to understand the factors that underlie consumers' perceptions of importance and self-relevance*" (Olson, 1995: 189). From the consumers' perspective, products are important or self-relevant only when their attributes (the means) lead to important, useful consequences and values (the ends). These "*consequences and values in the means-end chain are more self-related, personal, and emotional and, therefore, are a major source of the motivation that energizes and directs consumer decision-making*" (ibid: 190). As a result, the nature of the "**micro**"

methodology has stayed closest to the Rokeach's conceptualisation of terminal values rather than instrumental values:

"*Quite frequently respondents reach a level where they are talking about terminal values such as those indicated by Rokeach* (Gutman, 1982: 66). However, "*Rokeach's interest in values has not led to his developing mechanisms for translating instrumental values into choices of objects to satisfy those values. Therefore, from a marketing perspective more needs to be done to demonstrate how preferred end-states of existence are translated into specific choices in specific situations*" (ibid: 63).

Thus, a "**micro**" methodology should be used. It indicates a greater focus on values as end-states of existence or criteria (terminal values) as opposed to modes of behaviour (instrumental values). Also, in contrast to modes of behaviour, **criteria** have more in common with terminal values as they are used by researchers and practitioners to describe the relationship between product/service consumption and self. This approach suggests a new means-end chain theoretical framework:

"*More recent work links values and products together via "means-ends" chains. Most of these begin by asking about important product attributes as perceived by respondents, then probing until the researcher identifies more general motives or values regarding that product*" (Durgee et al., 1996: 91).

4.14 A Micro Means-End Chain Approach to Doctors' Drug Choice

Doctors learn about a product by categorizing it, by placing it in their minds – memorizing it – in a category of equivalent brands called a "product category", for example, *diuretics* for hypertension treatment. Important for the purpose here is that the theoretical framework explains the role of clinical values or criteria when a doctor is developing a therapeutic class choice. The major reason for this cross-therapeutic class analysis is that doctors are making choices across categories of products. This requires that our approach to measuring clinical values has to be based on two fundamental assumptions about prescribing behaviour:

1. that clinical values, defined here as desirable clinical criteria, play a dominant role in guiding therapeutic choice patterns; and
2. that doctors cope with the tremendous diversity of products that are potential satisfiers of their clinical values by grouping them into therapeutic classes so as to reduce the complexity of choice.

In addition to these two assumptions about prescribing behaviour that are essential to the particular form of the model and its most appropriate measures of clinical values, there are two other assumptions of a more general nature. These assumptions are that all therapeutic choices have consequences for the patient, and that GPs learn to associate particular consequences with particular therapeutic choices.

The central aspect of the model is that doctors choose therapeutic classes that produce desired clinical consequences and minimize undesired consequences. It is suggested that values provide consequences with positive or negative valences. Therefore, *the clinical values-therapeutic consequence linkage* is one of the critical linkages in the model.

As previously noted, Rokeach (1973) suggests that values are ordered in importance. This assumption also give clinical consequences importance, in that consequences leading to important clinical values should be more important to a doctor than those leading to less important clinical values.

In terms of product choice, there is a major difference between ordinary consumers and doctors. The former have no specific skills to choose the products they buy, while the latter have a long medical training. All doctors are taught to take a medical history and to make initial decisions about the aetiology of the patient problem. Similarly, all doctors are instructed in the use of drugs and are familiar with other therapies. Thus, a choice among alternative therapeutic solutions is based on the attributes of the therapeutic classes that they have learned that will produce the desired consequences. Therefore, the *second important linkage* in the model is that between consequences/benefits and product attributes.

The Means-End Chain Model (MEC) embraces these two relevant linkages.

While research in prescribing behaviour has often focused on doctors and their consensus in terms of product attributes rather than clinical values, the current study opens up a different, complementary **micro** approach. This view rests on the idea that medical knowledge is often latent but arises to influence cognition under certain conditions, such as when doctors search for clinical values to support their prescribing behaviour. Our view can be called a new means-end approach to therapeutic decision making. It emphasises that clinical values from medical education and clinical practice are continuously present and become operative as a function of the patient characteristics. This new approach reveals a way to understand some inconsistencies in the findings of previous research on drug choice and suggests a research agenda that derives from the means-end chain theoretical and conceptual structure that assumes that clinical value or criteria acquisition represents a ***medical cultural process*** which determines drug choice: "*Culture is the source of any group's collective memory and provides a basis for consciousness. The* ***values*** *that people hold dear, their collective sense of self and their aspirations are rooted in cultural learning. Moreover, the material components of culture – the tools and trappings used in daily life – have deep roots in these ideational aspects. In this way culture comes to play an important role in* ***product choice****, usage and resistance. Deciding to use, and picking a particular brand of children's cough syrup, are rooted in culturally-based ideas and* ***values*** *about health, child rearing and causality*" (Mariampolski, 1999: 78).

This *medical cultural process* enables us to hypothesize that GPs create arrays of therapeutic classes that will be instrumental in helping them achieve their desired clinical consequences, which in turn move doctors toward valued clinical criteria:

"*To enable a person to achieve his/her values, groups or categories of products (product classes) have to be related systematically to the higher level ends if the chain is to serve its instrumental purpose*" (Gutman, 1982: 62).

In the psychological literature, problem-solving, judgment and decision-making typically refer to different research paradigms and models. However,

"*In complex real task environments such as are encountered in medicine, the processes of problem solving, judgment, and decision-making relate to one another very closely*" (Elstein et al., 1978: 10).

It is, therefore, not surprising that a means-end approach to problem solving, judgment, and decision-making is the dominant theoretical perspective of this research project. Reynolds and Whitlark (1995) also claims that:

"*One way to understand a means-end framework is to think of consumer decision-making as a problem-solving process*" (ibid: 9).

4.15 Research Goals

Newell and Simon's (1972) information processing theory emphasizes that rational human problem solving is characterised by the adaptation to the problem to be solved. Since it is adaptive, "*a theory of problem solving must be, first, a description of how different kinds of problems are solved, and, second, a taxonomic or logical analysis of the interrelations among problem types*" (Elstein et al., 1978: 22). In line with this reasoning, two objectives were defined:

First, to describe how different kinds of clinical problems are solved, means-end chain researchers need to be able to obtain *cognitive material that represents GPs' prescribing-relevant knowledge.*

Second, an analysis of the interrelations among clinical problem types requires the selection of dimensions and finding cases for classifications: "*a well-constructed typology can be very effective in bringing order out of chaos. It can transform the complexity of apparently eclectic congeries of diverse cases into well-ordered sets of a few important dimensions*" (Bailey, 1994: 33).

With a well-constructed typology, means-end chain researchers are able to develop realistic representations of GPs' daily clinical work. That is, patient typologies can be useful as heuristics devices to highlight:

(a) *the relevant theoretical features or dimensions of the type*;

(b) *exhibited extreme clarity on all dimensions.*

This is generally true for taxonomic techniques that are based on qualitative, conceptual typologies: "*The monothetic typologies...are formed conceptually and deductively. Any empirical data, if utilized at all, enters the process relatively late, after the conceptual types have been formed*" (ibid: 34).

The patient typology, as a conceptual type derived from relevant clinical values, embraces a heuristic search process for prescribing decision-making. As the diagnostic process is taught to medical students and reinforced by medical guidelines, doctors are assumed *to use similar medical typologies to select different drug treatments*. These patient typologies are consensual and used by the medical community to identify the major clinical criteria of both practical and intellectual interest and offer possible drug treatment solutions. However, a consensual typology does not mean a similar drug therapeutic approach, even when medical guidelines are available for first-line drug treatment.

In a book about hypertension, born at the Department of Medicine and Therapeutics, **University of Glasgow**, Western Infirmary in Glasgow, McInnes (2000) recognised that "*unfortunately, the standards of care are extremely variable, ranging from total neglect to over-intensive use of drugs in individuals who stand to gain little if anything from treatment...Earlier guidelines differed in their views of the optimal threshold for treatment, the choice of first-line drugs and the goals of treatment*" (ibidem: 27).

As a consensual patient typology does not mean a similar drug treatment, we have to distinguish *two different steps* in terms of *research design*:

- *the patient typology definition* (i.e., the link between the diagnostic process and the therapeutic approach); and
- *the therapeutic approach* (i.e., drug choice).

The *first step* is attached to "*clinical criteria or clinical values*" in terms of *patient typology definition*, while the *second step* uses the patient typology for therapeutic decision-making. The latter step is relevant because it opens the opportunity for categorising Portuguese GPs' first-line drug treatment. This means that for this means-end chain approach, ***understanding*** *and* ***explanation*** *take precedence over* ***prediction*** *as the scientific contribution of the theory*. In line with this reasoning, *this study has two goals*:

1. *to identify the links between product attributes and therapeutic consequences and from these to clinical values employed by GPs as they choose among therapeutic classes for patients with hypertension*;
2. *to use these clinical values (i.e., patient typologies) for categorising Portuguese GPs according to their first-line drug therapy.*

4.16 Research Focus and Research Methods

In this phase of the research process, we believe that each patient typology will be "designed" by the GP to simulate certain aspect of the doctor-patient encounter, notably the final part of the diagnosis process and management. The interpersonal skills of the GP, the degree to which a patient feels satisfied with the encounter are not assessed at all. Our **aim** is not to provide an explanation of GP thought by use of more elementary processes, operations, or capabilities. This rationale is characteristic of process-tracing studies as a whole. Our **focus**, rather, is on *GPs' **prescribing-relevant knowledge** stored and organised within the GPs' memory which is used for connecting self related clinical values with specific product attributes that satisfy them in terms of desired clinical consequences* (see Chapter Two: ***Figure 2.2: Study Overview***).

One reason for **means-end chain** advocates' enthusiasm about the use of qualitative, in-depth interviews, is its links across different levels of abstraction: "*unlike those output from traditional factor analysis or multidimensional scaling methods, is structural in nature and represents the linkages or associations across levels of abstraction (attributes-consequences-values) without reference to specific brands...Interpretation of this type of qualitative, in-depth information permits an understanding of consumers' underlying personal motivations with respect to a given product class*" (Reynolds and Gutman, 1988: 12).

4.17 Levels of Abstraction: *Attributes, Consequences and Values*

In analysing laddering data (see Chapter Five), each category is usually characterized as being either an ***attribute***, or a ***consequence***, or a ***value***. The distinction between cognitive categories should, of course, be based on a conceptual definition of these terms. However, "*The laddering literature is surprisingly void of such definitions*" (Grunert and Grunert, 1995: 217). It is obvious that coding is a complicated process that gives a lot of latitude to the researcher. Thus, special attention should be paid to it in terms of methodological discussion than has been done up till now.

At the time of writing, we are not aware of any study on doctors' prescribing behaviour that has used the *means-end chain theory* and its *laddering technique* for the definition of an hierarchical cognitive structure that links *attributes, consequences, and personal values*. Because of a scarcity of research in this area, the **concepts** of *attributes, consequences* and *values* were defined in accordance with both *the review of the literature* (see Chapter III), *medical guidelines* and *medical books for the management of hypertension* (see Chapter Two). Based on these aids, this *iterative coding*[14] was revised with the help of one cardiologist and one GP.

[14] Iterative coding means that a first coding is performed, and the implications of this coding are made transparent by aids like doctors, medical books and medical guidelines.

This procedure continued until the coding appeared to be in line not only with prescribing-relevant cognitive categories widely shared by the medical community, but also with previous research on drug choice.

The review of the literature, which describes the influence of ***product attributes*** on drug choice, along with *medical guidelines* and *medical books for the management of hypertension*, were used to clarify the author's definition of the concept included in the lower level of the means-end chain model (i.e., *attributes*).

Most research into the prescribing behaviour of GPs examined the relative importance placed on product ***attributes*** such as *efficacy* or *effectiveness*, *side effects*, *compliance with the therapeutic regimen*, *cost*, *dosage schedule*, *drug interactions*, *risk of dependency*, *overdose toxicity*, *speed in reducing symptoms*, and *contraindications* of the drug (Freeman et al., 1993; Chinburapa and Larson, 1992; 1988; Chinburapa et al., 1987; Segal and Hepler, 1985; 1982; Epstein et al., 1984; Zelnio, 1982 Lilja, 1976). For example, Chinburapa and Larson (1988) asked 98 GPs and cardiologists to indicate the importance of several attributes in the treatment of patients with essential *hypertension*. Although patient characteristics were not evaluated in their model, results revealed that the incidence of *side effects* and drug product *efficacy* were the two most important ***attributes***.

Zelnio (1982) also identified *side effects*, *efficacy*, and *contraindications* as the most important drug attributes rated by American doctors.

Segal and Hepler (1985) found that outcomes such as *disease control*, *patient compliance with the therapeutic regimen*, and *low side-effects* were valued alike for both *antihypertensive* and *antidiabetic* therapies, whereas *cost* was less important, suggesting that doctors may value outcomes similarly from disease to disease. In this study, ***patient compliance with the therapeutic regimen*** was classified as an ***attribute***. However, medical books related to the practical management of hypertension and medical guidelines stress that the *patient compliance with the therapeutic regimen* depends on drug ***attributes*** such as *efficacy* or *effectiveness*, *side effects*, *cost*, *dosage schedule*, and *drug interactions*. In line with this reasoning, ***patient compliance with the therapeutic regimen*** is a ***consequence*** of specific drug attributes, **not an *attribute***.

Adverse drug events, *efficacy*, and ***patient characteristics*** were found to be important considerations when GPs prescribe medication. Freeman et al. (1993) found that ***patient characteristics*** such as the patient's ***age***, the patient's ***sex*** and ***general patient factors*** were important dimensions on drug choice. Unfortunately, these researchers did not clarify the concept of ***general patient factors***. Nevertheless, Freeman and colleagues pointed out that ***patient characteristics*** (i.e., patient's ***age*** and ***sex***, as well as ***general***

patient factors) influence GPs' prescribing decisions for patients with panic disorder. This reinforces the researcher's conviction that "***patient characteristics***" may be a major contribution to GPs' drug prescribing behaviour.

Most prescribing studies described in Chapter Three sought to establish whether general measures of doctor attitudes, subjective norms, and intentions (i.e., *measures that did not specify* ***patient characteristics***) could predict a general measure of prescribing behaviour. This method was developed because "*General measures of attitude and prescribing behavior are easier to collect than* ***patient-specific measures****, especially given the current state of most prescription drug information systems*" (Lambert et al., 1997: 1769). As a result, it is not possible to use previous studies on doctors' prescribing behaviour for developing the coding process of concepts such as ***clinical values*** and ***consequences***. As these concepts are not available, we decided to use *medical guidelines* and *medical books for the management of hypertension* as important sources for coding development. That is, the cognitive concepts of ***clinical values*** and ***consequences***, along with ***product attributes***, particularly those that were listed in the literature review, were encapsulated within a coding procedure that derived mainly from *medical guidelines* and *medical books for the management of hypertension.*

This approach improves *the face validity of verbalizations of cognitive processes* because it reduces the subjective judgement of the researcher (Grunert and Grunert, 1995).

Different medical books related to the practical management of hypertension (Birkennhager, 1996; Beevers and MacGregor, 1995, Houston, 1992) subdivide ***product attributes*** on 3 dimensions:

1. *pharmacological characteristics of the drug*;
2. *economy of the drug*; and
3. *mechanism of action.*

According to different medical guidelines (WHO-ISO, 1999; 1993; JNC VI, 1997; WHO, 1996), ***the pharmacological characteristics of the drug*** embrace therapeutic properties such as *effectiveness, low side-effects, neutral metabolism, smooth action, tolerability, trough-peak ratio* and *safety.*

The ***economy of the drug*** includes the *cost* of the treatment: "*The cost of therapy may be a barrier to controlling high blood pressure and should be an important consideration in selecting antihypertensive medication*" (JNC VI, 1997: 2427). Furthermore, the **cost** of therapy has been a main concern for health authorities:

"*Various bodies in different countries have pontificated about advising doctors how treat high blood pressure. This plethora of guidelines has been partly brought about by the financial pressures related to the* ***cost*** *of treatment and a genuine desire to improve patients' blood pressure control and their quality of life*" (Beevers and MacGregor, 1995: 171).

Since therapeutic classes have different ***mechanisms of action***, their proper use should become clear when the patient populations suitable for each therapeutic class are specified and the usefulness of combination therapy is establish. Thus, ***the mechanism of action*** is also a ***product attribute***'s dimension, particularly for doctors who disagree with a stepped-care protocol[15]:

"*The basic concept behind step-care programmes is that what really matters in antihypertensive treatment is blood pressure reduction per se, not the means or mechanisms by which blood pressure is reduced*" (Birkennhager, 1996: 155).

Doctors would be aware of ***product attributes*** because they receive information about the physiological effects of therapeutic classes from their patients who experience such effects of drugs during consumption. In line with this reasoning, *drug experience* is also an important ***attribute*** on drug choice because the doctor becomes aware not only of its ***mechanism of action***, but also its ***cost*** and ***pharmacological properties***.

Moving up the means-end chain from ***attributes*** to ***consequences***, we assume that doctors prescribe drugs for avoiding or reducing patients' cardiovascular problems: "*The primary goal of treatment of the patient with high blood pressure is to achieve the maximum reduction in the total risk of cardiovascular morbidity and mortality*" (WHO-ISH, 1999: 164).

As a result, the ***consequence*** level encapsulates not only *cardiovascular risk reduction* for the improvement of the patient's *quality of life*, but also ***less morbidity and mortality***. However, it is only possible to obtain these therapeutic goals, if *the patient's compliance with the therapeutic regimen* is a reality:

"*Poor adherence to antihypertensive therapy remains a major therapeutic challenge contributing to the lack of adequate control in more than two thirds of patients with hypertension*" (JNC VI, 1997: 2430).

Patients were found to improve their *compliance* with the therapeutic regimen when a therapeutic class has *less side effects* than other drugs or when drugs from the main classes available are used as *monotherapy*. If this is possible, and *no orthostatic hypotension* will occur, *the patient's compliance with the therapeutic regimen* is a reality.

[15] In a stepped-care protocol, therapy should be simple, starting generally with a single diuretic, at low dose (in an effort to reduce adverse effects), and only later if necessary progressing to more elaborated therapeutic regimens.

In line with the reasoning that has been advanced, it is possible to argue that the ***consequence level*** embraces not only doctors' therapeutic *goals*, but also *strategies* for improving patients' *compliance with the therapeutic regimen.* Means-end theory (Reynolds and Gutman, 1988) simply suggests that the way in which the physical ***attributes*** of products are linked to ***personal values*** of individuals is the manner by which products gain personal relevance, essentially, the manner in which meaning is established. Thus, *a physical* ***attribute*** *is important only to the extent to which this* ***attribute*** *delivers a benefit or* ***consequence*** *to the consumer through the perception of product usage. The perceived* ***consequence*** *of product usage, then, is important only to the extent that this* ***consequence*** *is linked to another higher level, ultimately, to an individual's* ***personal value orientation.***

For the reasons discussed above, a connected hierarchy of translations of meaning, from the ***product attributes*** to how, *ultimately*, they are ***personally meaningful*** to the prescriber, would seem a logical way of storing therapeutic information and thus serve as the perceptual lens through which doctors see and process clinical information. Although this last point clearly is conjecture, particularly given the early stage of research in this domain, there is mounting evidence that personal clinical values should be taken into account in defining and managing drug choice:

"*the model allows the physician's personal values and assessments of clinical information to be integrated. Thus, the art of making a therapeutic decision has embedded within it many small judgments, from those based on clinical science to those based on personal values*" (Mancuso and Rose, 1987: 1284).

The concept of clinical value is similar to the Mancuso and Rose's concept of focal point: *The clinical criterion is an element of clinical information in a case that the GP considers to be critical in the assessment of the case and around which is built the therapeutic approach.*

Clinical values *or* ***clinical criteria*** *such as* ***patients' demographic characteristics*** *and* ***concomitant disorders*** *are critical clinical information on antihypertensive drug choice.* That is, *our conceptualisation of* ***clinical values*** follows medical guidelines on the management of hypertension: "*Special considerations in the selection of initial therapy include demographic characteristics and concomitant diseases that may be beneficially or adversely affected by the antihypertensive agent chosen* (JNC VI, 1997: 2426). "*All available drug classes suitable for the initiation and maintenance of antihypertensive therapy, but the choice of drugs will be influenced by many factors:*

- *the cardiovascular risk factor profile of the individual patient;*
- *the presence of target-organ damage, of clinical cardiovascular disease, renal disease and diabetes;*
- *the presence of other co-existing disorders that may either favour or limit the use of particular classes of antihypertensive drugs*" (WHO-ISH, 1999: 167/168).

As pointed out earlier, medical guidelines suggest 3 main dimensions in terms of critical clinical values or clinical criteria:

- blood pressure levels (BP);
- demographic characteristics; and
- concomitant diseases.

Blood pressure levels, both systolic (SBP) and diastolic (DBP), have been shown to be an important criterion for selecting drug therapy. However, "*Decisions about the management of patients with hypertension should not be based on the level of blood pressure alone, but also on the presence of other risk factors, concomitant diseases such as diabetes, target-organ damage, and cardiovascular or renal disease, as well as other aspects of the patient's personal, medical and social situation*" (WHO-ISH, 1999: 162).

Demographic characteristics such as ***age***, ***gender*** and ***socio-economic status*** are critical values on drug choice. In a similar vein, ***racial*** and ***ethnic*** minority populations are growing segments of our society. Thus, ***race*** or ***ethnicity*** are *clinical values* that may influence antihypertensive therapy. All these *clinical values* may coexist with various other **concomitant diseases** such as *left ventricular hypertrophy*, *cerebrovascular disease*, *angina*, *renal disease* and others. In other words, ***comorbidity*** is also a critical clinical value for the management of hypertension.

4.18 Summary

The wide variety of patients seen in general practice (as a result of the general accessibility of primary health care) inhibits a strong focus on one particular antihypertensive guideline. Nevertheless, these guidelines can be thought of as '***philosophies of prescribing***' that guide the therapeutic approach. This perspective, which is based upon the realisation that therapeutic products go beyond functional pharmacological properties and are actually integral to doctors' clinical lives, has resulted in research that focuses on doctors' "***philosophies of prescribing***" and on how therapeutic classes fit into their clinical world, particularly on the relationship between therapeutic categories and patient typologies. In line with this reasoning, we focused on drugs prescribed for newly diagnosed cases of hypertension because of our interest in the initial choice of therapy rather than switching patterns among the various antihypertensive drugs. Therefore, ***the direction of this research*** - in both ***theory*** and ***empirical work*** - will be towards developing an understanding of the GPs' ***clinical values*** that guide first-line antihypertensive drug therapy. As a result, ***the research design*** embraces both ***qualitative*** and ***quantitative*** approaches. The former uses the MEC model (Gutman, 1982) and its Laddering technique (Reynolds and Gutman, 1988) for understanding the relationship between patient typologies and drug choice.

The MEC model (Gutman, 1982) and its Laddering technique (Reynolds and Gutman, 1988) have been discussed in detail. Rather than focus on a particular level of meanings, the MEC theoretical framework incorporates all levels into a conceptual model that additionally focuses on the associations (or derived meanings) between these levels.

The central tenet of the MEC theory is that product, service or behaviour meaning structures stored in memory, consist of a chain of hierarchically-related elements. The chain starts with the product, service or behaviour components (attributes) and establishes a sequence of links with the self concept (personal values) through the perceived consequences or benefits produced by certain attributes of the product, service or behaviour. This forms a ***means-end chain*** in that attributes are the means by which the product, service or behaviour provides the desired consequences or values, i.e. the ends. As a model of personal relevance, the MEC approach implies that marketing strategists should create and/or reinforce connections between product attributes (the means) and self-relevant consequences and values (the ends). That is, values have a powerful force in governing the behaviour of individuals in all aspects of their lives. Their use in marketing planning and strategy could be improved if the behaviour of consumers could be related to their values. This is the MEC's objective.

The most common method of measuring means-end chains has been the Laddering interview technique. This semi-qualitative approach is open to the respondent's own answers without flooding the interviewer with data, as other qualitative techniques do. Once means-end data have been collected, the analysis follows a three-stage process. First, the results from the laddering interviews are coded in order to develop an ***implication matrix***. Second, in filling in the implication matrix, individual respondent's ladders are decomposed into their direct and indirect components, which are usually presented in a so-called ***Hierarchical Value Map*** (HVM). Third, in order to develop specific marketing strategies, some means-end chains are selected from the HVM. To obtain the HVM, an new algorithm was presented. By describing this newly available software (LadderMap) (Gengler and Reynolds, 1995) the stages of computer analysis of means-end data were clarified.

This chapter presented a general discussion about the nature of values. As values are inherently complex, clinical values classification can thus be approached from many angles. Based on the work of researchers such as Gutman (1982) and Reynolds and Gutman (1988), we suggested that the theoretical framework providing the greatest potential for illuminating a systematic approach to drug choice is the one that links values and products via "means-end" chains. Thus, clinical values were theoretically

and methodologically encapsulated within the **micro** means-end chain view. By focusing on means-end chain (MEC) theoretical framework, *clinical values research approach* represents a long-neglected opportunity for pharmaceutical marketers. The underlying assumption of this approach is that values play an important role in guiding GPs' therapeutic choice. Thus, a "micro" approach using a laddering technique "forces" GPs to think about the clinical values (i.e., clinical criteria or focal points) they use to select the therapeutic classes. If this connection can be made, marketing managers will be in better position to understand how clinical values or criteria influence drug choice.

To the best of our knowledge, there is no research on doctors' prescribing behaviour that has used Means-End Theory and the Laddering approach as the basis for defining patient typologies and subsequent therapeutic approaches (see **Appendix Four**: *Letter from Richard Bagozzi*).

In summary, ***the author's definitions of the concepts included in the means-end chain analysis are GPs' real prescribing-relevant cognitive categories*** (see **Appendix Five**: *Laddering Interviews and Verbatim Example*).

5 CHAPTER FIVE Eliciting Portuguese GPs' Prescribing-Relevant Cognitive Categories: *Attributes, Consequences and Clinical Values*

5.1 Introduction

As indicated on Chapter Three, most of the research on doctors' prescribing behaviour has placed great emphasis on brand attributes. GPs' ***clinical values***, in terms of different patient characteristics used to organise a therapeutic approach, have however been neglected, or have received scant attention in these studies. Patient characteristics are, by definition, the centre of clinical reflection (WHO-ISO, 1999; 1993; WHO, 1996; Veterans Health Administration, 1996). Therefore, it does not make sense to analyse GPs' prescribing behaviour without precisely identify how doctors organise and retrieve the clinical information that they use to develop their therapeutic approach. For that reason, Chapter Five examines the effect of clinical values on GPs' therapeutic approach in primary care.

After defining the *substantive* and *methodological* objectives, the purpose of Chapter Five is to introduce the reader to the data collection methods used for gaining insights into GPs' therapeutic approach. This Chapter also includes the preliminary interviews that were organised to support this exploratory phase of the present research. Finally, Chapter Five presents Portuguese GPs' prescribing-relevant cognitive categories in terms of *drug attributes*, *therapeutic consequences* and *clinical values*.

5.2 The Importance of Laddering Data for Obtaining *Substantive* and *Methodological* Objectives

In this exploratory phase of the research, only two objectives were considered: a ***substantive*** objective and a ***methodological*** objective.

Substantively, the research consisted in applying the means-end chain theory and the laddering technique with the aim of *retrieving an excerpt from doctors' cognitive categories/structures* with regard to their prescribing behaviour. The results obtained from this approach will be relevant for pharmaceutical marketers interested in drug choice. With this information, marketers have a better basis for product development and the design of marketing strategies, particularly segmentation, positioning, differentiation, and communication strategies.

Methodologically, we are interested in investigating how helpful the laddering technique is in *eliciting excerpts from doctors' cognitive categories/structures* concerning the link between patient characteristics and antihypertensive therapeutic categories. Specifically, we want to investigate an important application proposed by Reynolds and Gutman (1988) who argued that it is possible to segment/categorise "***consumers with respect to their values orientation for a product class or brand***" because ***"the value orientations in a person's ladder may serve as the basis for classification***" (Reynolds and Gutman, 1988: 25).

5.3 Data Collection Methods for Gaining Insights into Portuguese GPs' Therapeutic Approach: *Purposes* and *Procedures*

To accomplish the **substantive** and **methodological** objectives mentioned earlier, a review of previous research was augmented by an exploratory investigation of **the means-ends chain theory** and **the laddering approach** in the product category of **cardiovascular drugs**.

Up to this point we have talked for the most part as though research design decisions in drug choice are based solely on theoretical and methodological criteria. This is of course highly relevant. However, issues of practicability play a major role in this kind of research. The medical field we might wish to select (i.e., primary care) may not be open to study, for one reason or another; and even if it is (only with a special authorisation), effective strategies for gaining access to the necessary data will need to be developed. Similarly, not all the people we wish to talk to, nor all the contexts we wish to sample, may be accessible; certainly not at the times we want them to be. The problem of gaining access to data is particularly serious in therapeutic decision making since one is operating in settings where the researcher generally has little power, and people have pressing concerns of their own that often give them little reason to co-operate. This is true for gaining access to prescribing data both from the pharmaceutical industry and health authorities (see Chapter III).

Thus, co-operation was obtained both from an international pharmaceutical company and from Portuguese health authorities. The former provided the sampling frame of Portuguese GPs, as well as financial support to visit different Portuguese health centres all over the country, while the latter gave the researcher special authorisation to visit and to be supported by the local health authorities in connection with the interviewing process. With their support, not only *pharmaceutical company interviews*, but also *focus groups*, and *in-depth interviews* were conducted to gain insights into GPs' prescribing-relevant cognitive categories/structures.

Clearly, pharmaceutical managers and GPs questioning are likely to provide different kinds of data, and thus will be useful at different stages of the inquiry. The same applies to the various methods available for gaining access to prescribing data (Patton, 1990). That is, methods were selected according to different purposes:

5.3.1 Pharmaceutical company interviews

These interviews were conducted because pharmaceutical managers represent the naturally reflective and objective persons in the prescribing field. That is, they are respondents who are especially sensitive to the area of concern. As a result, they are particularly important for understanding which level(s) of the means-end chain theoretical framework is/are represented in their approach to the pharmaceutical market.

5.3.2 Focus Groups

The focus group interview is one of the most frequently used data-collection methods in marketing research (Chisnall, 1992).

As Morgan (1997) suggested, focus group interview is typically used to explore highly specific issues. In line with this reasoning, focus group discussion was used to get an initial sense of the dimensions that are of particular relevance to Portuguese GPs' prescribing decision-making.

An informal setting within different health centres were used to explore a limited number of "focus questions" on GPs' prescribing behaviour (see *Section 5.4.2*). Our approach to focus group discussion focused more on the meanings embedded either in therapeutic language or, in some moments, in construction of a patient typology. GPs "got caught up" in the spirit of group discussion and *revealed more than they would in the more formal interview setting.* Concerns are often expressed about whether the presence of the researcher influences the interaction between members group that the interaction is no longer authentic (Morgan, 1997). Nevertheless, as doctors asked questions of each other, it was possible to come to a consensus that no one GP would have articulated on their own. Furthermore, the purpose of the focus group method was to evaluate whether GPs were used to develop a relationship between patient characteristics and therapeutic approach, particularly drug choice.

5.3.3 In-Depth Interviews

In-depth interviews, as well as in focus groups interviews, the interview environment necessary for conversation to take place was given special attention. Basically, the interview environment was created such that the GPs were "*willing to be introspective and look inside themselves for the underlying motivations behind their perceptions of a given product class*" (Reynolds and Gutman, 1988: 13). That is, an interview environment was developed to assist GPs in critically examining the therapeutic assumptions underlying their drug choice. In other words, we created an interview environment where GPs were not threatened and thus willing to be introspective in terms of therapeutic decision-making. We want them to feel as if on a voyage of therapeutic self-discovery and that the object of the trip was to revisit daily clinical activity in terms of prescribing behaviour.

Most of the time, these in-depth interviews, as well as focus group interviews, were developed in the GPs' library room at the health centre. This is a special room were GPs are able to read a medical article or a medical book, or simply to rest for a while during a break. In some cases, the health centre had not a library room. When this happened, GPs were led into a room especially arranged (easy chairs, dimmed lights) to create an informal, cosy atmosphere. When this was not possible, the in-depth interview took place at GPs' clinical office.

In all cases, the purpose was to make the interviewee feel comfortable and at ease in order to induce a positive mood state towards talking freely during the interview.

As with all qualitative research, the interviewer must maintain control of the in-depth interview. This is not easy because laddering technique is supposed to elicit *attribute-consequence-value* associations, which are abstract concepts. Nevertheless, the reason why an in-depth interviewing technique was used is quite clear: *to help Portuguese GPs think critically about the linkages between patient characteristics and prescribing behaviour that were found to exist during the focus group interviews*. This was accomplished by "*minimizing the responses options, in essence being as direct as possible with the questioning, while still following what appears to be an "unstructured" format*" (Reynolds and Gutman, 1988: 13). GPs were forced up the ladder of abstraction mainly by using probes of the form "*why is this important for you?*". A ladder was considered to be at its terminal level when:

- *GPs started giving circular answers*; and
- *GPs were unable or unwilling to answer* (a GP question such as "*do you have more questions?*" would be assumed as the end of the interview).

In conclusion, to identify Portuguese GPs' *cognitive linkages between patient characteristics and prescribing behaviour* we used *focus groups* and *individual interviews*.

5.4 THE EXPLORATORY STUDY

5.4.1 Pharmaceutical Company Interviews

The pharmaceutical company that supported the financial costs of the exploratory study markets three different therapeutic categories for hypertension treatment (ace inhibitor, beta blocker, and diuretic) and was about to lunch a fourth one (angiotensin II antagonist). Interviews were held individually with the strategic business unit (SBU) director, the senior product manager for cardiovascular diseases, and in a subsequent phase, with the senior product manager and the doctor in charge of cardiovascular diseases within the medical department of the company.

Informal open-ended questions were used for issues such as:

- the recent research on GPs' prescribing behaviour on hypertension;
- GPs' perceptions about the interest of World Health Organisation – International Society of Hypertension (WHO-ISO) or others medical guidelines for the management of hypertension;
- the cardiovascular market research and other sources of information to support marketing strategy; and
- the implementation of the communication strategy of the company's antihypertensive drugs.

The main conclusion of these interviews was that the communication strategy had been focused on brand attributes only.

The main source of information on doctors' prescribing behaviour has been the Portuguese subsidiary of International Marketing Service (IMS). A substantial amount of internal research had been done locally and internationally by this pharmaceutical company to support the marketing strategy of the new therapeutic category of angiotensin II antagonist. With regard to the marketing strategy of this therapeutic category, this private study reinforces the conviction that an "attribute" approach to brand position would be more appropriate. An international marketing and communication programme developed by the international product manager for the new drug, suggested a strong emphasis should be placed on ***brand attributes***, particularly ***tolerability*** and ***dosage regimen*** (i.e., once-daily dosing), as well as the ***new mechanism of action*** of this therapeutic category. The last attribute would be used to differentiate the new angiotensin II brand from other first-line, antihypertensive therapies. From the previous positioning attributes, the company planned to develop a brand image based on the ***simplification of antihypertensive therapy and patient management.*** Combined with the brand image, the international marketing strategists of the company planned to develop a meaningful brand character to obtain a special place in the minds of

doctors. The following slogan was therefore used to add significant communication value to the brand:

"***The power you need with the tolerability your patients deserve***" (Pharmaceutical Company's International Product Manager, August 1997). Expectations in terms of the future importance of angiotensin II antagonists in the cardiovascular market are significant. Despite the tremendous success of ace inhibitors and calcium antagonists on world-wide antihypertensive therapy (with 75% of market share), primary and secondary international market research indicates that there are important needs that remain unmet in the marketplace, as well as a wealth of opportunities for new agents. Although there are many effective drugs currently available for the treatment of hypertension, the medical need for safe and well-tolerated therapies for a wide range of patients is still not fully met as indicated in a recent, European, qualitative market research study. According to the main conclusions of this study, doctors in four developed European countries revealed the following limitations of antihypertensive drugs:

- sub-optimal efficacy;
- interactions with concomitant medications;
- lack of tolerability and negative side effect profile; and
- efficacy vs. side-effects trade-off.

5.4.2 Focus Group Interviews with General Practitioners (GPs)

Based upon the assumption that doctors' perceptions of antihypertensive therapy are related to clinical knowledge structures that link drug choice to patient characteristics, focus group interviews were organised in the south (Lisbon), and north (OPorto) of the country to test some of the assumptions derived from the European, qualitative market research study. The focus group was formed in accordance with guidelines traditionally followed in the marketing research field (Chisnall, 1992; Kinnear and Taylor, 1991; Sampson, 1986). Participants were selected locally after an invitation made by the health centre director, who was contacted in advance by fax or phone, following rules imposed by local health authorities. Participants were recruited to fit the demographic profile of prescribers of cardiovascular drugs in primary care (i.e., GPs).

It has been suggested that "***for nonconsumer goods research (pertaining to architects, doctors, industrial purchasers, engineers, investors, contactors, etc.), 6 or 7 people may be best for maximum interaction among participants***" (Kinnear and Taylor, 1991: 311). Although the researcher had pointed out to the local health authorities the importance to have between six and eight doctors in every focus groups' discussion, only five GPs were present in the focus group discussion in Lisbon and Oporto. Nevertheless, five focus group participants are enough when respondents have strong skills on the

discussion topic:

"***There is no correct size for any group. The number of participants may vary according to the type of participant, the subject matter for discussion and the group leader's preference. For example, with highly articulate and fluent professional people, the ideal size is perhaps five or six participants*** (Sampson, 1986: 33).

In Coimbra, were there is also a prestigious medical school, the number of GPs was insufficient for a focus group discussion. Nevertheless, the three GPs that were present had an interesting conversation on drug therapeutic approach to hypertension and some insightful data were obtained. These GPs had been practising in the medical profession for between 10 and 20 years. In Lisbon and OPorto, the clinical experience was the same for three of the five members of the focus groups discussion. In relation to the other two peers, they were selected to represent one younger and one older doctor. In other words, it was noticed that the younger had between 5 and 10 years of clinical experience, while the older enjoyed considerable experience of more than twenty years of medical practice.

All participants were practising medicine in the health centre where the focus group took place, and our sessions were held towards the end of the afternoon. The support or identity of the participating pharmaceutical company was not revealed in the interview.

The focus-group discussion was initiated after a short presentation of the research project, its main goals and time-schedule. GPs were previously informed by the health centre director that the focus-group discussion would last between forty-five and sixty minutes, and this was emphasised by the researcher at the very beginning of the conversation. This introduction was followed by the researcher's invitation to initiate an informal discussion about hypertension, specifically in relation to the treatment problems doctors faced in their daily clinical activity. The discussion was not restricted and GPs started to exchange ideas about different patients and different therapeutic approaches, including patients' lifestyle modification and other non-pharmacological decision-making.

Discussion about the therapeutic approach to hypertension in general, and the drug treatment in particular, centred on doctors' perceptions of the ***therapeutic classes*** used to treat hypertension, ***attribute*** differences between them and indications in terms of the ***patient*** demographic profile. The researcher's intervention as a moderator covered such topics as patients' age, gender, lifestyle, cardiovascular risk factors and comorbidity, plus their influence on drug choice. This approach was in accordance the figurine described on previous guidelines for the management of mild hypertension.

Emphasis was also placed on the clinical heuristics[1] that doctors had to devise in order to manage hypertensive patients.

When a ***therapeutic class*** was cited, the attributes used to evaluate clinical values were discussed, and differences in terms of the drug therapeutic approach were explored.

The main findings of the focus group approach can be summarised into four vectors:

- The hypertensive patient's demographic profile;
- The concomitant diseases and factors of risk (i.e., comorbidity);
- The therapeutic approach; and
- The GP's demographic profile.

Vectors can be described together as a means of matching the drug's properties to the individual hypertensive patient according to a supreme clinical value that: '***there are no diseases, there are patients***'.

As mentioned at the beginning of this section, medical guidelines for the management of mild hypertension were found to influence this individual patient centred therapeutic approach. Several non-pharmacological interventions were put forward for the primary prevention of hypertension.

[1]Basically, heuristics are simple "if ..., then ..." propositions that connect an event with an action. "Heuristics may be stored in memory like mini decisions plans or scripts that are applied fairly automatically to information encountered in the environment" (Peter and Olson, 1987: 250).

However, participants recognised that lifestyle modifications were often difficult to encourage at large, and compliance to such recommendations was frequently poor over the long term. Consequently, GPs stressed that in most cases a combination of non-pharmacological interventions and a drug therapeutic approach was necessary.

Once the diagnosis of essential or primary hypertension was reached, several different risk factors for patient cardiovascular disease were analysed to define the therapeutic approach:

- Age*
- Gender*
- Family history of premature cardiovascular disease*
- Previous cardiovascular events*
- Previous cerebrovascular events*
- Left ventricular hypertrophy
- Systolic blood pressure
- Diastolic blood pressure
- Lifestyle (i.e., nutritional factors; sedentary lifestyle; smoking; alcohol)
- Dyslipidaemia (i.e., high total and low-density lipoprotein-cholesterol and low high-density lipoprotein-cholesterol)
- Obesity
- Diabetes
- Renal disease
- Micro-albuminuria

GPs were unanimous in stressing that some of these factors (i.e., with the sign *) cannot be modified, but are relevant for drug choice.

Ace inhibitors and ***diuretics*** were found the two most important therapeutic categories for most hypertensive patients. The former were mentioned more often in relation to hypertensive patients with obesity/diabetes/renal disease, while the latter were preferred in the case of elderly hypertensive patients. The use of ***diuretics*** was, however, a controversial subject as was opinion concerning the best therapeutic approach depending on the patient's age and gender.

Beta blockers were attached mostly to ***young*** hypertensive patients, while ***calcium antagonists*** were only mentioned in the case of ***elderly*** hypertensive patients with ***angina***. However, ***ace inhibitors*** were also referred to as a possible antihypertensive solution for ***middle-aged*** and ***elderly*** patients with ***dyslipidaemia*** (i.e., subjects with either isolated elevated triglycerides, low HDL **cholesterol** or elevated LDL **cholesterol**, or a combination of the above that are associated with an increased incidence of ***coronary heart disease***). In this case, ***diuretics*** proved to be inappropriate. The ***association*** in a fixed dose of ***ace inhibitor*** and ***diuretic*** was a controversial therapeutic solution in the case of ***elderly*** patients with high blood pressure, unless ***congestive heart failure*** was noticed. In this case, some GPs suggested the use of ***ace inhibitors*** in *monotherapy*, followed, if necessary, by the *association in a fixed dose* of ***ace inhibitor*** and ***diuretic***.

5.4.3 Doctors Individual Interviews

A convenience sample of seven doctors was defined to test the concepts obtained from the focus group approach, in accordance with the laddering approach. After these interviews, the main phase of the field work was initiated. This second phase started in April 1997, one week after the focus group interview. The main phase of these interviews was developed between May 1997 and the middle December 1997, with an interruption in August 1997, required by the Algarve Health Region Administration. The strong increase in the number of tourists during summer time keeps doctors very busy in the third quarter of the year. A new opportunity for developing laddering interviews in the Algarve in the last quarter of 1997, was also cancelled because of the stormy weather.

Several health centres were randomly selected from a framework made available by local health authorities. Participant doctors were then recruited with the help of the health centre directors who invited their peers to collaborate in a study. To stimulate and encourage doctors' participation, health centre directors had to mention to their peers that the study was authorised previously by central and regional health authorities. The special authorisation, as well as the explanation of the goals of the study, were described by the health centre director to GPs who were still free to reject any type of collaboration.

In total, 317 doctors from different health region administrations agreed to talk with the researcher. Lisbon and Tagus Valley Health Region, which is the most important one in terms of patients and number of doctors, contributed 173 interviews. In the North Health Region 86 interviews were carried out, while the Centre Health Region only offered 58. However, of these 317 interviews, only 113 (35%), actually took place under the appropriate conditions needed in order to obtain the desired hierarchical levels proposed by the Means-End Chain Theory (Gutman, 1982) (see Table 5.1).

TABLE 5.1: Formal and Laddering Interviews

HEALTH REGION	**FORMAL INTERVIEW**	**LADDERING INTERVIEW**	TOTAL
Lisbon and Tagus Valley	127 (73%) (62%)	46 (27%) (41%)	173 (55%)
North	52 (61%) (26%)	34 (39%) (30%)	86 (27%)
Centre	25 (43%) (12%)	33 (57%) (29%)	58 (18%)
TOTAL	204 (64%) (100%)	113 (36%) (100%)	317 (100%)

The other 204 were considered ***formal interviews***, and could be characterised as a friendly informal conversation about hypertension in general, mainly focus on patient characteristics according to the GPs' annual report in hypertension.

5.4.4 Formal Interviews

As pointed out earlier, the ***formal interviews*** were found inappropriate for the development of an hierarchical structure of attributes, consequences and values. The '*symptoms*' of this interviewing reality were noticed when most doctors produced superficial responses to avoid introspection about the real reasons underlying their prescribing behaviour.

In Lisbon and Tagus Valley Health Region, 127 of the 173 (73%) GPs were not very keen to discuss their prescribing behaviour deeply. In the North Health Region this figure was a little bit lower (61%) than in the Lisbon and Tagus Valley Health Region, while in the Centre Health Region the laddering rejection was only 43%.

It is our belief that these low figures are a consequence of an investigation that was launched by the police in the second quarter of 1997, when sought to detect any relationships between prescribing and unauthorised gifts, financial rewards or other incentives given by the pharmaceutical companies. As a result, the topic of the conversation was not the most convenient because some doctors were suspicious about the real aims of the research project.

As pointed out earlier, the focus of both the ***formal interview*** and ***laddering interview*** were patient centred according to the GP annual report in hypertension (see Table 5.2).

TABLE 5.2: Hypertensive Patients Report

- **Centre** Health Region - **Aveiro** Health Sub-Region
- **Ovar** Health Centre - 1996 Report

Hypertension	*DIAGNOSTICATED PATIENTS*		*CONTROLLED PATIENTS*	
AGE	MALE	FEMALE	MALE	FEMALE
< 45	0	0	0	0
15 – 44	170	204	121	156
45 –64	827	1254	622	999
> = 65	939	1501	717	1177
SUB-TOTAL	1936	2959	1460	2332
TOTAL	4895		3792	

In accordance to Table 5.2 - ***Hypertensive Patients Report***, GPs argued that ***male*** hypertension appears to be frequently under-treated. Two main heuristics were used to organise the therapeutic approach: ***age*** and ***gender***. These heuristics were used to 'force' doctors to identify the higher-ordered concepts. This laddering approach was found to be centred on patient typologies according to the GPs' annual report on hypertension.

The annual report was used in subsequent interviews as the introductory topic of conversation, in order to create an interview environment familiar to GPs. This personally meaningful clinical context provided a more suitable approach for laddering to proceed: "***...the best answer to the level of focus seems to lie in evoking a relevant situation into which the respondent can project him- or herself. This gives the best assurance that wherever laddering starts, meaningful connections between elements will be obtained***" (Gutman, 1991: 147).

Doctors were aware that because the researcher was not an expert in hypertension, the interviewing process would include some questions that would seem somewhat obvious and possible even naive. This tendency to create a slight sense of vulnerability on the part of the interviewer was well accepted and led to a conducive environment for the interview. However, this effort was not enough to produce substantive information in terms of the means-end chain approach.

The attempt to use the heuristics ***age*** and ***gender*** in order to establish means-end chains proved unsuccessful. When faced with the question "***Why*** are **age** and **gender** important to pharmacological decision?" Doctors pointed out that these two factors and others like concomitant disease (i.e., comorbidity) guide drug choice. When the researcher probed as to "***Why*** are all these **factors** important to the pharmacological decision?", doctors argued that therapeutic classes had different mechanisms of action which determine contraindications for their use in some patients. From this point on, we tried to establish a hierarchical means-end chain by asking again "***Why*** are contraindications of therapeutic classes important for your pharmacological decision ?". Most doctors responded that a cautious approach to drug is required because a significant number of ***elderly*** hypertensive patients present other ***cardiovascular problems***.

To push the respondent up or down in the means-end ladder, the following question was applied: "***Why*** do you use different ***therapeutic classes*** for ***elderly*** hypertensive patients with ***cardiovascular problems*** ?". If the GP was unable to link to adjacent concepts between a specific hypertensive patient and a drug class, the subsequent question would be more direct: "***Why*** do you, or do you not, prescribe ***diuretics*** for hypertensive patients?" In this case, neither the ***positive*** nor the ***negative*** laddering approach produced satisfactory "chunks[2]" of information. The common answer was that the use of ***diuretics*** or other therapeutic categories in the treatment of hypertension depends on patient characteristics. Different free-elicitation strategies were performed to obtain information about the cognitive structures of doctors, changing from ***differences by occasion*** to ***triadic sorting***. In the former, an ***age-regression contrast probe*** was advanced for encouraging doctors to think critically about, and be able to verbalise, their prescribing behaviour. Moving respondents backwards in time was also found not suitable for these doctors. The same result was obtained with the ***third-person probe*** approach, citing national or local opinion leaders with opposite views on hypertension treatment.

[2]Individual concepts that are perceived to be similar in some relevant way are grouped or **chunked** together by consumers' cognitive processing systems. "A chunk is an abstract meaning with "psychological significance" to the person" (Peter and Olson, 1987: 82).

In the ***triadic sorts***, each GP was asked to think back to the three most recent hypertensive patients in order to know "***Why***, and which, would you treat most differently than the other two?". However, no important feed-back was obtained in terms of the means-end chain approach.

5.4.5 Differences Between Formal and Laddering Interviews

The looped conversation described above was a clear indication that the majority of doctors were not interested on prescribing introspection. Though doctor ladder productivity was not a success in 65% of all the interviews, the same techniques described earlier produced a very significant contribution to the laddering process in most of the remaining respondents. This difference includes not only the ***substance*** of the elicited information but also the ***time*** that was spend in each interview. ***Formal interviews*** lasted for 15 up to 30 minutes, while ***laddering interviews*** have varied between 40 minutes up to 90 minutes. In most cases, the time of a ***laddering interview*** may be included in a interval of 50 up to 60 minutes. Doctors who were interviewed after the end of their daily activity, particularly those who finished in the afternoon period, were found to spend more time with the researcher. By contrast, GPs who were interviewed before their daily clinical work started, particularly in the morning, were less generous in their time allocation. In a normal day of work, three up to five ***formal*** and ***laddering*** interviews were obtained.

5.4.6 Ladder Characteristics

The 113 respondents whose interviews have developed clear links between the hierarchical adjacent levels of attributes, consequences, and values provided between 3 and 7 ladders each, and a total of 548 ladders, which represents an average of 4.85 ladders per respondent (Table 5.3).

Table 5.3: Number of Elicited Ladders

Number of Ladders per Respondent	*Number of GPs per Number of Ladders*
3	3
4	29
5	65
6	14
7	2
TOTAL NUMBER OF RESPONDENTS: 113 TOTAL NUMBER OF LADDERS: 3*3 + 4*29 + 5*65 + 6*14 + 7*2=548 AVERAGE NUMBER of LADDERS per RESPONDENT: 548/113=4.85	

The average number of ladders per respondent was almost the double that found in recent research where the same algorithm was used (e.g., Frauman et al., 1998; Klenosky et al., 1993). The number of ladders per respondent corresponds directly with the number of different therapeutic classes that GPs usually prescribe for hypertension. In other words, ***ace inhibitors***, ***diuretics***, ***beta blockers***, ***calcium antagonists***, and ***association*** in fixed dose of ***ace inhibitors*** and ***diuretics*** are the most common therapeutic classes prescribed by GPs to treat hypertension. However, some innovative doctors may have a larger set of drugs that includes not only the previous therapeutic categories but also the new therapeutic

category of angiotensin II antagonists. In contrast to these larger sets of therapeutic categories, some doctors were found not particularly interested in all possible solutions. The intention to prescribe all the therapeutic categories is, therefore, not a homogeneous reality, since doctors have different pharmacological approaches to the same patient characteristics. Furthermore, hypertensive patients present not only different demographic characteristics, but also different associated diseases or risk factors. As a result, it is possible to argue that the number of ladders per respondent is a function of the number of therapeutic categories attached to those patient characteristics elicited during the interview. In most cases, the number of hypertensive patients described by doctors in each ladder is greater than three. Therefore, each respondent was able to describe an average of fifteen different hypertensive patients during all the interview.

5.4.7 Coding Laddering Interviews

The laddering interviews confirmed that the General Practitioners' therapeutic approach of hypertension is based on patients' ***demographic profile***, particularly ***age***, ***gender***, ***race/ethnicity***, and ***socio-economic status***. Some ***risk factors***, such as ***heredity***, ***genetic factors***, ***body weight***, central and portal ***obesity*** and ***metabolic balance*** (i.e., cholesterol levels), and ***nutritional factors***, were also found relevant in drug choice.

Furthermore, patients with hypertension and other ***coexisting diseases*** (e.g., ***comorbidity***) were also clinical clues to the therapeutic approach. Faced with this complexity, we decided to simply use the coding process in accordance with the ***medical guidelines*** for the management of hypertension and prevention of associated cardiovascular disorders. Therefore, the process of coding the laddering interviews, in terms of the separation between clinical values, attributes of products, and consequences of their use was made less complex. Nevertheless, the coding process was discussed with a Portuguese opinion leader in the treatment of hypertension, Dr. Pedro Marques da Silva, who is in charge of hypertension and dyslipidaemia consultation at St. Marta Hospital in Lisbon.

Categories were found to follow several different medical protocols in terms of diagnosis and therapeutic approach (WHO-ISH, 1999; 1993; Silva 1997; Veterans Health Administration, 1996; WHO, 1996).

5.4.8 Laddering Results: The GP's Hierarchical Means-End Chain

The GPs' therapeutic approach follows a logical sequence of steps in which doctors identify the patient's demographic and pathological characteristics before any prescribing decision is made.

Drug choice follows the hierarchical sequence of clinical values-attribute-consequence. As a result, coding laddering data will be presented in accordance to the GPs' hierarchical means-end chain (Table 5.4).

TABLE 5.4: The GP's Hierarchical Means-End Chain

MEANS-END CHAIN	*NUMBER of CATEGORIES*
CLINICAL VALUES	12
PRODUCT ATTRIBUTES	11
CONSEQUENCES	8
TOTAL	***31***

Based on Table 5.4, it is possible to argue that ***clinical values*** have a critical importance for the GP's hierarchical means-end chain in terms of the number of categories. It is also important to point out that most of these categories represent ***patient typologies***. The other two hierarchical levels have also a significant number of categories.

In order to facilitate the understanding of the Hierarchical Value Map (HVM), all these 31 categories will be described.

5.4.8.1 Clinical Values

Twelve categories were created within the clinical value dimension.

Table 5.5: The Value Dimension

VALUE DIMENSION AND IMPORTANCE	*NUMBER OF CATEGORIES*
Age (314)	3
Age and Comorbidity (482)	5
Age and Drug Combination Therapy (90)	1
Age and Gender (107)	3
Age and Level of Blood Pressure (46)	1
Age and Preventive Effect (8)	1
Age and Socio-Economic Status (27)	1
Age and Treatment (24)	1
Age and Type of Blood Pressure (63)	1
Age/Gender/Comorbidity (145)	2
Comorbidity (207)	10
Race/Ethnicity (6)	1

The concepts of ***age, gender,*** and ***comorbidity*** when isolated or in association, were the main demographic and clinical values used by GPs. The demographic profile of hypertensive patients, particularly ***age*** and ***gender*** were found to be relevant clinical values. However, ***age*** turned to be the most important heuristic in terms of prescribing behaviour.

Table 5.6: The Age Dimension

CATEGORIES of AGE	*IMPORTANCE of the CATEGORY*
YOUNG-ADULT	104
MIDDLE-AGED	108
ELDERLY	102
TOTAL	***314***

Doctors referred to three levels of hypertensive patients in terms of age:

- Young-Adult (less than 45 years old)
- Middle-Aged (45 - 64 years old)
- Elderly (65 or more years old)

These three levels of age are important descriptors in terms of prescribing behaviour. The importance of the category indicates the number of times these levels of age were cited by respondents during the ladder development.

The concept of ***age*** combined with ***comorbidity*** is the most important one in terms of value presence within the different ladders. In this case all the diseases associated with hypertension are most common in ***elderly*** patients.

Table 5.7: The Age and Comorbidity (Elderly Patients) Dimensions

Elderly Hypertensive Patients with:	*IMPORTANCE of the CATEGORY*
ANGINA	114
CEREBROVASCULAR DISEASE	112
PERIPHERAL VASCULAR DISEASE	39
RENAL INSUFFICIENCY	106
CONGESTIVE HEART FAILURE	111
TOTAL	***482***

Four out of five represent ***elderly*** patients with ***hypertension*** and other common coexisting diseases: ***angina***, ***cerebrovascular disease***, ***congestive heart failure***, and ***renal insufficiency***.

If an ***elderly*** hypertensive patient has no ***comorbidity*** associated with hypertension, doctors usually prescribe ***diuretics*** or ***ace inhibitors***. However, if the same patient has ***angina*** combined with hypertension, ***calcium antagonists*** will be prescribed instead.

Gender is another important descriptor in terms of prescribing behaviour, particularly in ***middle-aged*** (i.e., age) hypertensive ***woman*** (i.e., gender) in ***perimenopausic[3] period*** as Table 5.8 suggests.

Table 5.8: The Age and Gender Dimensions

AGE and GENDER	*IMPORTANCE of the CATEGORY*
HYPERTENSIVE WOMAN IN PERIMENOPAUSIC PERIOD	92
YOUNG-ADULT WOMAN	6
YOUNG-ADULT MAN	9
TOTAL	***107***

GPs differentiated the hypertensive ***woman*** in ***perimenopausic period*** from other ***middle-aged*** patients with hypertension because their prescribing behaviour may change according to this sensitive and crucial period in a woman's life. GPs pointed out the fact that, before menopause, most women are at a 50% lower risk of cardiovascular disease than men. However, when the woman reaches menopause, the risk of cardiac disease or depression becomes very high. Therefore, psychological problems such as ***anxiety*** or ***depression***, (i.e., comorbidity) are not rare.

[3]Current medical knowledge holds that the average age for perimenopause, a period of changing ovarian function, although a discrete point in time, is about 51 years.

Obesity also is sometimes noticed.

Table 5.9: The Age/Gender/Comorbidity Dimensions

HIPERTENSIVE WOMAN in PERIMENOPAUSIC PERIOD with:	*IMPORTANCE of the CATEGORY*
OBESITY	47
ANXIETY/DEPRESSION	98
TOTAL	145

Comorbidity alone encapsulates several independent patient factors of risk, diseases and characteristics that are, of themselves, important discriminators in terms of prescribing behaviour. This is a crucial step, since all the subsequent procedures used to define the therapeutic approach depend on these clinical conditions that still present risk of cardiovascular disease. Table 5.10 identifies the most important of these discriminators.

Table 5.10: Hypertensive Patients with Comorbidity

COMORBIDITY	*IMPORTANCE of CATEGORIES*
DIABETES/DYSLIPIDAEMIA	95
LEFT VENTRICULAR HYPERTROPHY	29
CENTRAL OR PORTAL OBESITY	26
GOUT	6
INTELECTUAL ACTIVITY	2
TACHIARRHYTHMIAS	18
DRY COUGH	8
DYSLIPIDAEMIA	12
PROSTATISM PROBLEMS	1
DIABETES	10
TOTAL	***207***

Comorbidity alone has ten different sub-categories. However, ***intellectual activity*** is not a clinical problem. Its inclusion into ***comorbidity*** is based on the assumption that therapy should be tailored to individual characteristics of the hypertensive patient (reported only by two GPs).

Diabetes and ***dyslipidaemia*** associated with hypertension are by far the most important discriminators of drug choice. All the other concepts presented in Table 5.10 are attached to hypertension in ***elderly patients***. From all these clinical values, it is possible to reinforce the importance of different characteristics that influence drug treatment in elderly hypertensive patients. For example, ***age and drug combination therapy*** encapsulates elderly hypertensive patients whose blood pressure (BP) requires more than just one therapeutic class to normalise the BP values.

In elderly patients, ***age and type of BP*** and ***age and level of BP*** were also found important discriminators in terms of drug therapeutic approach. The former distinguishes systolic BP from other types of hypertension, while the latter assumes the treatment of borderline hypertension in a different way from mild or moderate hypertension.

Elderly hypertensive patients with ***low income*** (i.e., age and socio-economic) may also be treated with less expensive therapeutic categories.

Other drug treatments for non-cardiovascular diseases that elderly hypertensive patients require was also identified as a ***clinical value***.

Although the Portuguese population is almost all Caucasian, a very small percentage of African citizens from former Portuguese colonies have been working in Portugal. As a result, a few doctors reported ***race*** as another clinical value that influences their prescribing behaviour. For example, these GPs suggested that the ***ethnicity factor*** is important in defining the anti-hypertensive treatment because black patients were found "to respond" better to calcium antagonists rather than to ace inhibitors.

It has already been pointed out that the ***clinical value dimension*** encapsulates several ***patient typologies*** whose configuration derives from all the ***clinical values*** that have been described. This complexity has been recognised by specialised institutions on the management of hypertension:

"***In preparing these guidelines, the World Health Organization/International Society of Hypertension (WHO/ISH) Sub-Committee was keenly aware that there are marked differences between individual patients with similar levels of hypertension, which have important implications for decisions concerning treatment. Hypertensive patients differ with respect to age, blood pressure elevation, organ damage and concomitant risk factors and diseases, and they live in societies in which cardiovascular risk and economic resources also differ widely***" (WHO-ISO, 1993: 905).

5.4.8.2 Pharmaceutical Product Attributes

Eleven different pharmaceutical product attributes were mentioned to justify the intention to prescribe six different therapeutic categories, which were found relevant in terms of attributes such as ***effectiveness***, ***low side-effects*** and ***tolerability*** (Table 5.11).

Table 5.11: The Attribute Dimension

ATTRIBUTE CONCEPTS and IMPORTANCE	THERAPEUTIC CATEGORY
Additive Hypotensive Effect (92)	**Association between Diuretic and Ace Inhibitor (ADAI)**
Drug Experience (78)	**Diuretics and Beta Blockers**
Effectiveness (546)	**Diuretics; Beta Blockers; Ace Inhibitors; Calcium Antagonists; and ADAI**
Low Cost (193)	**Diuretics and Beta Blockers**
Low Side-Effects (189)	**Diuretics; Beta Blockers; Ace Inhibitors; Calcium Antagonists**
Neutral Metabolism (27)	**Beta Blockers; Ace Inhibitors; Calcium Antagonists**
New Mechanism of Action (8)	**Angiotensin II Antagonists**
Safety (95)	**Ace Inhibitors; Calcium Antagonists**
Smooth Action (40)	**Diuretics; Ace Inhibitors; Calcium Antagonists**
Tolerability (146)	**Diuretics; Beta Blockers; Ace Inhibitors; Calcium Antagonists**
Trough-Peak Ratio (48)	**Ace Inhibitors**

By just taking a quick glance at the above Table, one can see that some figures are very high. For example, the ***effectiveness*** attribute has a value of 546 attached to it. This value is an indication of redundant hierarchical connections. That is, GPs mentioned an association between ***effectiveness*** and the adjacent concept several times in multiple different ladders gathered in the course of the interview. This is also true for the

consequence elicitation. However, a ***different reality*** was obtained from ***the clinical value dimension***. That is, ***the multiple ladders that were gathered from each respondent have no redundant clinical values, and they represent different patient categories.***

Effectiveness is by far ***the most important attribute*** that GPs reported. The value of 546 indicates that ***effectiveness*** was almost always present in any ladder developed by the 113 respondents. This finding suggests that all the therapeutic categories are considered effective in the treatment of hypertension. Otherwise it would not make sense to use them. This indicates that the attribute ***effectiveness*** is not appropriate for distinguishing between the therapeutic classes.

The ***second*** most important attribute is ***low cost*** (193) which is associated exclusively to ***diuretics*** and ***beta blockers***. The same reality can be found with ***drug experience*** (78), which is the seventh most important attribute. The intimate connection between low cost and drug experience that has been established with diuretics and beta blockers indicates that doctors are aware not only that these two therapeutic classes are have been used for decades, but also they are not expensive. However, **it does not mean that these attributes have discriminant power.** It means only that for specific patients characteristics (i.e., clinical values) doctors prescribe these therapeutic categories because they have the appropriate pharmacological

characteristics. When asked "***Why***", doctors referred to different attributes that diuretics and beta blockers contain, including ***effectiveness***, ***low cost***, and ***drug experience*** in the cardiovascular market, among others.

The ***third*** most important attribute is ***low side-effects*** (189), which have been attached to ***Diuretics, Beta Blockers, Ace Inhibitors,*** and ***Calcium Antagonists***. However, with a closer inspection of ladders, it is possible to detect that both ***antagonists of angiotensin II*** and ***association of diuretic with ace inhibitor*** have a lower incidence of side-effects than the previous therapeutic categories. The former, given its ***new mechanism of action***, is considered an ***alternative treatment*** (consequence) when ace inhibitors cause ***side-effects*** such as ***dry cough*** (i.e., side-effect). The latter, has been presented in several ladders as an important therapeutic class ***to reduce the adverse effects*** (consequence) of both therapeutic categories.

The ***fourth*** most important attribute is ***tolerability*** (146). Conceptually, it is possible to distinguish tolerability from low side-effects because the former includes not only the latter, but also a low interaction with other drug treatment that patients have to take. Again, diuretics, beta blockers, ace inhibitors, and calcium antagonists are well tolerated. The same is true for angiotensin II antagonists and for the association between the diuretic and ace inhibitor if we analyse the ***consequences*** of their use.

The ***fifth*** most important attribute is ***safety*** (95). However, this attribute is only mentioned by some doctors when ace inhibitors and calcium antagonists are analysed. It is reasonable to speculate that some doctors have the perception that these therapeutic categories are less risky in terms of contraindications than diuretics and beta blockers. If this assumption is true, it would be possible to say that some doctors prefer to use ace inhibitors and calcium antagonists rather than diuretics and beta blockers.

The ***sixth*** most important attribute is the ***additive hypotensive effect*** (92), which is only attached to the association between the diuretic and ace inhibitor. In short, it appears that doctors prefer to use the association in fixed dose of diuretic and ace inhibitor when just one of the components is not enough to reduce blood pressure values. This indicates that doctors consider ***monotherapy*** and ***compliance*** with the drug regimen as important ***consequences*** to be obtained with the use of some therapeutic classes to treat hypertensive patients, as explained later in this section. According to the respondents, the reason is easy to understand: poor adherence to antihypertensive therapy remains a major therapeutic challenge, contributing to the lack of adequate blood pressure control in a significant number of patients with hypertension.

The ***seventh*** most important attribute, which is the ***drug experience***, has already been mentioned.

The ***eighth*** most important attribute, ***trough-peak ratio***[4] (48), reinforces the importance of ***monotherapy*** and ***compliance***, in this case with the use of more recent ace inhibitors.

The ***ninth*** most important attribute, the ***smooth action*** (40), is attached to more recent diuretics, ace inhibitors, and calcium antagonists, particularly the last two therapeutic classes.

The ***tenth*** most important attribute, ***neutral metabolism*** (27), although a pharmacological characteristic present in some calcium antagonists and beta blockers, is almost exclusive to ace inhibitors. Diuretics were not mentioned. As with the ***safety*** attribute, it appears that some doctors prefer to prescribe ace inhibitors rather than diuretics to reduce blood pressure.

The ***final*** attribute, the ***new mechanism of action*** (8), is only mentioned by innovative GPs, who have been prescribing the new therapeutic category of antagonists of the angiotensin II.

[4] "*Recently, the American Food Drug Administration (F&D) has claimed that a new drug in order to be registered for once-a-day dosing must satisfy a new criterion: the trough/peak ratio. According to this new criterion, the blood pressure reduction at the moment of the administration of the drug at the end of the intervals between the doses (trough) must be at least 50% of the maximum blood pressure preduction (peak)*" (Birkenhager, 1996: 157).

5.4.8.3 Pharmaceutical Product Consequences

The 113 GPs who were interviewed reported eight different consequences. Four of these categories are particularly relevant to the context of the consequence dimension (1) cardiovascular risk reduction (2) less morbidity and mortality; (3) compliance; (4) quality of life. The redundancy noticed in these four categories means that there is a strong homogeneity across respondents in terms of consequences. Table 5.12 presents the listing of the eight consequences.

Table 5.12: CONSEQUENCES

CONSEQUENCES CONCEPTS and IMPORTANCE	*NUMBER OF SUB-CATEGORIES*
ALTERNATIVE TREATMENT (1)	1
CARDIOVASCULAR RISK REDUCTION (556)	3
COMPLIANCE (498)	1
LESS MORBIDITY and MORTALITY (547)	1
LESS SIDE-EFFECTS (56)	1
MONOTHERAPY (71)	1
NO ORTHOSTATIC HYPOTENSION (42)	1
QUALITY OF LIFE (386)	1

Only the consequence concept of ***cardiovascular risk reduction***, which is the most important ***consequence concept***, with a permanent presence in all ladders, has more than one category. As a result, the figure of 556 attached to ***cardiovascular risk reduction*** is bigger than the number of ladders (548).

The results mean that some doctors presented a larger ladder in terms of consequences that include not only the sub-category "***greater protection***", but also "***24 Hours BP Control***" and "***do not aggravate co-existing cardiovascular problems***", to reinforce the importance of ***cardiovascular risk reduction***, as represented in Table 5.13.

Table 5.13: Cardiovascular Risk Reduction

SUB-CATEGORIES of Cardiovascular Risk Reduction	*IMPORTANCE of SUB-CATEGORIES*
GREATER PROTECTION	491
24 HOURS BP CONTROL	40
DO NOT AGGRAVATE CO-EXISTING CARDIOVASCULAR PROBLEMS	25
TOTAL	***556***

It should be noted that only the consequence dimension, and not the categories, are represented in the final hierarchical value map (HVM). That is, redundant "chunks of meaning" that are elicited from the ladders, are "absorbed" by the specific concept. Repeated associations between adjacent concepts in the different ladders obtained from the same respondent, are not included into the implication matrix. When constructing the matrix, LadderMap counts the redundant association only once per respondent in order to guarantee that the final HVM is not influenced by sub-categories that encapsulate redundant information.

The most representative category within the concept of cardiovascular risk reduction is that of "***greater protection***". This category, as well as the

other two, reinforce the importance of the anti-hypertensive therapeutic categories as a means by which GPs improve cardiovascular protection against the risk that high blood pressure represents for different patients.

Along with cardiovascular risk reduction, ***consequence*** concepts like ***less morbidity***, less ***mortality*** and ***compliance*** play an important role in high blood pressure treatment. The former is, by itself, a sub-consequence of cardiovascular risk reduction, while the latter is of great importance in obtaining the others. All of them are important for improving the ***quality of life*** of the hypertensive patient.

Other consequence concepts are not as important as those described above. However, what seems to emerge from a closer analysis of all them, from ***monotherapy*** to ***less side effects*** and ***no orthostatic hypotension***, is the importance of improving patient compliance with the prescribed treatment. The same is true for the least important consequence concept, ***alternative treatment***. In this case, GPs who intend to prescribe the new therapeutic category of ***antagonists of angiotensin II*** try to avoid or reduce side-effects (e.g., dry cough), derived from the use of ace inhibitors in certain hypertensive patients. Having said that, it should be added that this reasoning reinforces the intimate connection between ***compliance***, ***less morbidity and mortality*** and ***cardiovascular risk reduction***, described above.

5.4.9 From the Implication Matrix to the Hierarchical Value Map

The goal at content code level of analysis was to focus on meanings central to the purpose of the research, in order to obtain strong reliability in terms of relationships between the categories. However, these ladders were "purified" in order to avoid respondents naming an association between two hierarchical concepts several times in the different ladders that were elicited. To obtain a meaningful, uncluttered hierarchical value map (HVM), all the redundant connections between adjacent attribute, consequence and value (ACV) hierarchical concepts were eliminated from the aggregate implication matrix.

Once these master codes were established as an initial process to embrace the importante distinctions that respondents have used to discriminate among products, numbers were assigned to these categories. These numbers were then used to score each element in each ladder, thereby producing an aggregate implication matrix with rows representing an individual respondent's ladder (doctors have multiple ladders and thus multiple rows) and the hierarchical categories within the ladder corresponding to the consecutive column designations. Thus, the number of columns in the ***square matrix*** corresponds to the 31 content codes that were established.

As mentioned earlier, the movement from the aggregate implication matrix to the HVM is based on 31 content codes previously defined:

Attributes (35%)*

(A1) Effectiveness
(A2) Low Cost
(A3) Low Side-Effects
(A4) Tolerability
(A5) Safety
(A6) Additive Hypotensive Effect
(A7) Drug Experience
(A8) Through-Peak Ratio
(A9) Smooth Action
(A10) Neutral Metabolism
(A11) New Mechanism of Action

Consequences/Benefits (26%)*

(C12) Cardiovascular Risk reduction
(C13) Less Morbidity and Mortality
(C14) Compliance
(C15) Quality of Life
(C16) Monotherapy
(C17) Less Side-Effects
(C18) No Orthostatic Hypotension
(C19) Alternative Treatment

Values (39%)*
(V20) Age and Comorbidity
(V21) Age
(V22) Comorbidity
(V23) Age/Gender/Comorbidity
(V24) Age and Gender
(V25) Age and Drug Combination Therapy
(V26) Age and Type of BP
(V27) Age and Level of BP
(V28) Age and Socio-Economic
(V29) Age and Treatment
(V30) Age and Preventive Effect
(V31) Race/Ethnicity

- The symbol * refers to the percentage represented by the number of each ACV hierarchical concept to the total number of concepts.

In order to provide a clear picture of the dominant relationships among the 31 content codes, the implication matrix was splitted into five sub-tables:

Table 5.14a - Implication Matrix for Therapeutic Category Approach

	To **Attributes**										
From	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11
Attributes											
A1	.	104.107	59.40	56.81	35.72	90.90	10.63	34.47	19.35	17.25	7.7
A2	6.8	.	24.47	17.46	.	.	57.57	.	3.3	1.1	.
A3	.	5.5	.	11.11	25.26	.	.	5.6	3.3	1.3	.
A4	1.1	1.1	3O.31	.	23.24	.	1.1	1.2	5.6	2.2	.
A5	.	.	25.27	8.8	.	.	.	2.2	1.1	2.2	.
A6	.	.	.	.	.	.	.	.	.	.	.
A7	2.2	5.6	24.26	32.33	.	.	.	.	.	.	.
A8	.	.	.	.	.	.	.	.	6.6	1.2	.
A9	.	.	.	.	.	.	.	5.5	.	1.1	.
A10	.	.	.	.	1.1	.	.	.3	2.2	.	.
A11	7.7	1.113	.113	3.113	.106	.70	2.56	.37	.7	.1	.

Table 5.14b - Implication Matrix for the Therapeutic Category Approach

	To **Consequences**							
From	C12	C13	C14	C15	C16	C17	C18	C19
Attributes								
A1	1.113	.113	3.113	.106	.70	2.56	.37	.7
A2	.107	. 107	55.106	.82	.	.	.3	.
A3	.90	. 90	78.89	.67	.	.	.3	.
A4	1.81	. 81	53.80	.65	.	.	.6	.
A5	1.72	.71	42.69	.53	.	.	.1	.
A6	.88	.90	1. 87	.65	68.70	22.54	.1	.
A7	2.63	.63	8.61	.43	.	.	.	.
A8	39.48	.48	1.20	.35	.	.	1.12	.
A9	.34	.35	.32	.21	.	.	30.33	.
A10	22.26	.26	1.8	.22	.	.	.1	.
A11	.8	.8	.8	.4	.	.	8.8	.

Table 5.14c - Implication Matrix for the Therapeutic Category Approach

	To **Consequences**							
From	C12	C13	C14	C15	C16	C17	C18	C19
Consequences								
C12	.	72.113	13.22	105.105	.	.	6.6	.
C13	.	.	.	12.12	.	.	.	.
C14	113.113	7.113	.	13.105	.	.	.	.3
C15	5.6	105.106	3. 3	.	.	.	.	.
C16	2.68	.70	37.67	.52	.	32.32	.	.
C17	1.55	.56	52.55	.39	2.2	.	1.1	.
C18	2.32	.37	36.36	.23	.	.	.	.
C19	1.8	.8	7.8	.4	.	.	.	.

Table 5.14d - Implication Matrix for the Therapeutic Category Approach

	To **Values**											
From	V20	V21	V22	V23	V24	V25	V26	V27	V28	V29	V30	V31
Attributes												
A1	.113	.113	.108	.103	.92	.89	.62	.45	.27	.24	.8	.6
A2	.31	.97	.37	.87	.38	.	.31	.36	.18	.1	.2	.3
A3	.73	.78	.56	.32	.37	.	.25	.17	.15	.1	.1	.4
A4	.57	.59	.38	.32	. 21	.	.20	.8	.3	.	.4	.1
A5	.58	.35	.43	.13	.14	.	.17	.	.	.	.	.3
A6	.85	.20	.1	.1	.	.87	.2	.1	.8	.23	.1	.
A7	.15	.54	.16	. 35	.8	.	.11	.9	.6	.	.1	.1
A8	.15	.42	.39	.13	.24	.	.1	.5	.	.	.3	.
A9	.18	.21	.14	.2	.5	.	.5	.3	.	.	.	.
A10	.11	.15	.22	.7	.6	.	.3	.1	.	.	.	.
A11	.3	.2	.8	.1	.6	.	.	.	.	.	.	.

Table 5.14e - Implication Matrix for the Therapeutic Category Approach

	To **Values**											
From	V20	V21	V22	V23	V24	V25	V26	V27	V28	V29	V30	V31
Consequences												
C12	.112	.113	.108	.104	.93	.87	.61	.45	.26	.24	.8	.6
C13	96.113	106.113	55.108	17.103	13.93	32.89	10.61	16.45	7.27	2.24	2.8	1.5
C14	.112	.113	.88	.96	.78	.86	.59	.41	.27	.24	.5	.6
C15	5.97	5.96	6.82	2.79	.70	1.65	.39	1.30	.19	.17	.4	.5
C16	.66	.15	.1	.1	.	.67	.2	.1	.7	.15	.	.
C17	.54	.12	.	.	.	.55	.	.	.2	.10	.1	.
C18	.20	.22	.14	.2	.5	.1	.5	.4	.	.	.	.
C19	.3	.2	.8	.1	.6	.	.	.	.	.	.	.

Table 5.14f - Implication Matrix for the Therapeutic Category Approach

	To **Values**											
From	V20	V21	V22	V23	V24	V25	V26	V27	V28	V29	V30	V31
Consequences												
V20	.	25.38	15.17	3.7	10.11	52.53	20.25	8.8	2.5	5.13	3.3	2.2
V21	35.49	.	47.63	72.84	34.64	2.7	14.16	5.12	2.5	.	.4	1.2
V22	32.35	31.35	.	23.34	23.43	.	2.4	1.2	.	.	.3	.
V23	8.8	11.14	17.17	.	16.19	.	2.3	2.4	2.3	.	.	.
V24	4.5	8.12	15.16	.	.	1.1	.1	.1		.	.	.
V25	31.37	7.11	.	1.1	.	.	1.1	.	2.6	16.20	.	.
V26	14.15	3.4	1.1	.	1.3	.	.	9.10	4.4	.	2.2	1.1
V27	3.4	4.7	.1	1.1	3.7	.	12.13	.	6.8	.	1.1	.
V28	3.3	1.2	.1	1.1	1.1	.2	.	1.2	.	1.1	.	1.1
V29	6.7	.	.	.	.	2.3	.	1.1	2.2	.	.	.
V30	2.4	.1	.	.	1.2	1.1	.	1.2	.	.	.	.
V31	1.1	.	.	.	.1	.	1.1	1.1	.	.	.	.

The entries in the implication matrix identify the number of times each pair

of concepts was associated together across respondents' ladders. Two types of relations were represented in this matrix: direct relations and indirect relations. Table 5.14, from "*a*" to "*f*" presents the row-column frequency implication matrices indicating the number of times in which all the row elements directly and indirectly led to all column elements. The numbers are expressed in fractional form with direct relations to the left of the decimal and indirect relations to the right of the decimal. Here it should be emphasised that this interaction from qualitative in-depth interviews to quantification, representing an individual respondent's ladder, is the "pedigree" of the LadderMap algorithm:

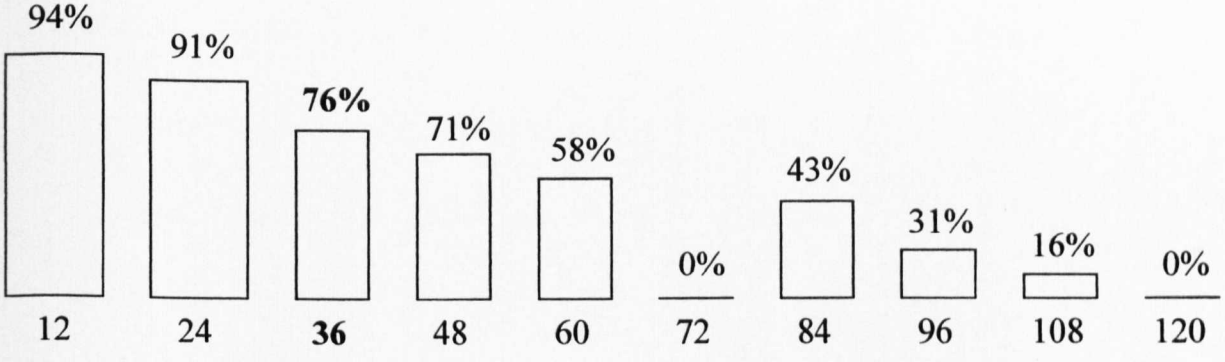
"***It is this "crossing over" from the qualitative nature of the interviews to the quantitative way of dealing with the information obtained that is one of the*** **unique** ***aspects of laddering and clearly the one that sets apart from other qualitative methods***" (Reynolds and Gutman, 1988: 19).

In filling in the implication matrix of aggregate relations, the LadderMap algorithm transforms individual respondent's ladders into sums of all the instances where concepts were linked in the laddering interviews.

As these associations can be counted in two ways - only the direct associations are included, or direct and indirect components between adjacent hierarchical concepts are counted, the bar chart derived from the implication matrix was analysed and a cut-off level decision was made.

After determining how much variance would be explained by different levels of cut-off values (see Figure 5.1), *it was decided to choose a cut-off value that represents 76% of all the associations*. This decision encapsulates a significant number of the associations derived from the raw laddering data. Furthermore, the cut-off level was chosen in accordance with Gengler and Reynolds' (1995) advice that *at least 70 percent of associations must be represented, but that the 75 to 85 percent range would be the best solution.*

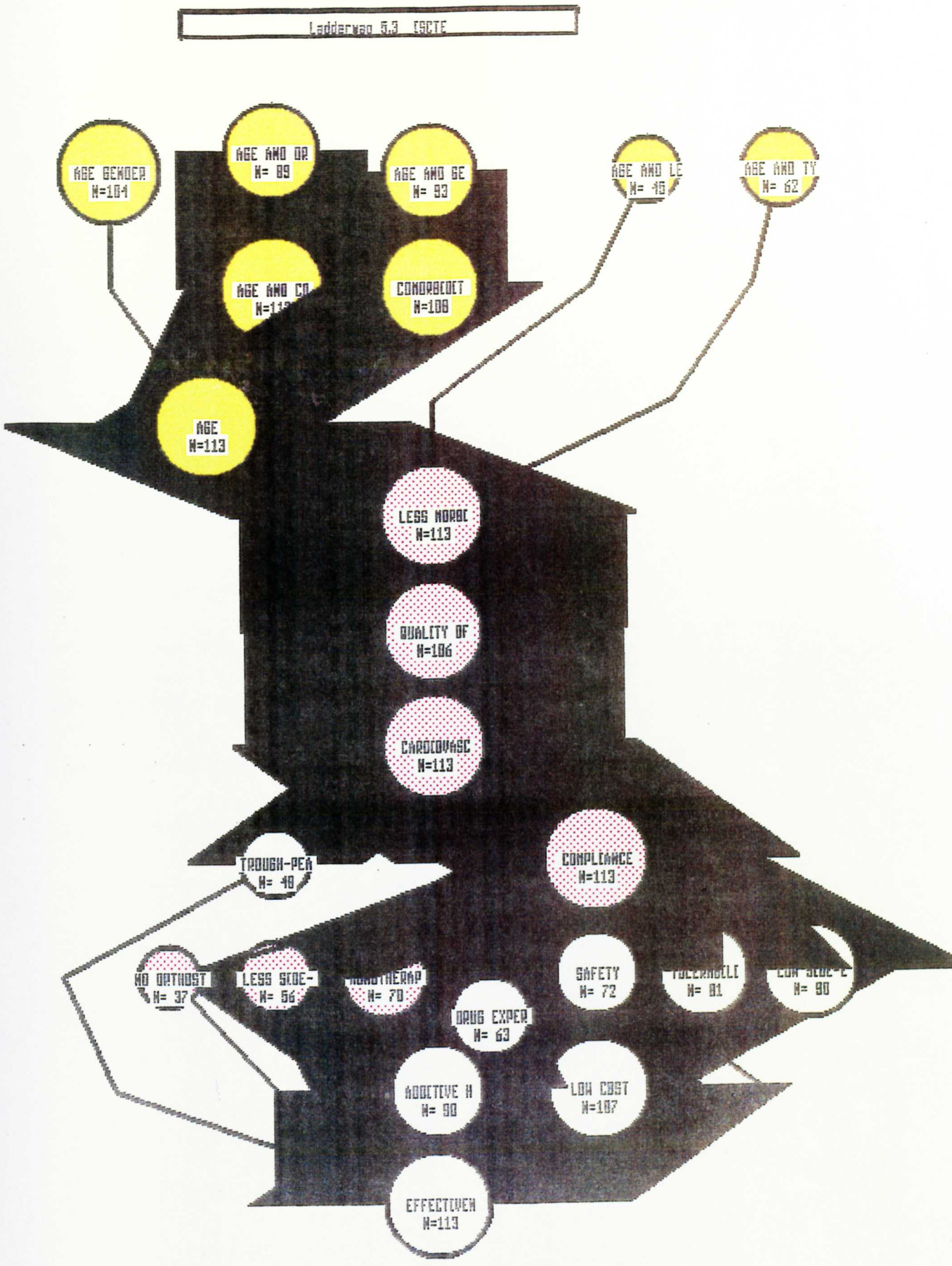
Figure 5.1: Percentage of Direct Links Represented by Each Cut-Off Point



As outlined earlier, *76% of all associations were obtained with a cut-off value of 36*, which means that a link is drawn between two concepts if at least 36 doctors have mentioned the concept as a direct or indirect consequence of another concept. Although this figure is higher than the value reported in previous studies (Reynolds and Gutman, 1988), it is important to bear in mind the specificity of the structure of medical knowledge:

"***There are indications that doctors' categorization of a physical illness may play a central role in the reasoning processes used by them in arriving at diagnostic and treatment decisions***" (Bordage and Zacks, 1984: 406).

As a result, it should be noted that the cut-off value of 36 is a normal figure if we assume that medical practice derives from a common medical, problem-based learning in which simulated patients and feed-back on prescribing have been used in undergraduate teaching and *have become* increasingly popular in postgraduate teaching and assessment (Maxwell and Howie, 1995; Roberts et al, 1995; Baerheim and Malterud, 1995; Norman, 1988; Gerritsma and Smal, 1988; Elstein and al., 1978). Furthermore, choosing a cut-off value of 36 associations or connecting linkages reduces the complexity and thereby increases the transparency of the resulting Hierarchical Value Map (HVM). That is, only those dominant relations among concepts that were mentioned most often by doctors have the opportunity to be fully represented in the HVM. This choice is somewhat arbitrary, but is supported by the fact that this cut-off decision is similar to an eigenvalue in factor analysis, which has the capacity to define which relations should be represented in the HVM and which should not.


Laddermap 5.3 [SCTE
AGE GENDER N=104
AGE AND OR N= 89
AGE AND GE N= 93
AGE AND LE N= 15
AGE AND TY N= 62
AGE AND CO N=11
CONDRBCDET N=108
AGE N=113
LESS NORBC N=113
QUALITY OF N=106
CARDIOVASC N=113
TROUGH-PEA N= 48
COMPLIANCE N=113
NO ORTHOST N= 37
LESS SIDE- N= 56
N=THERAP N= 70
SAFETY N= 72
N= 81
N= 90
DRUG EXPER N= 63
ADDITIVE N N= 90
LOW COST N=107
EFFECTIVEN N=113

The HVM was analysed in order to obtain a deeper understanding of how the cut-off decision had captured the most important patterns of meaning between ***attributes***, ***consequences***, and ***values***.

Twenty-three of the thirty one content codes/concepts were selected to represent the common pathways of meaning, representing how product attributes are related to clinical values. The number of content codes/concepts that were selected suggests a stable HVM, without loosing the most important "chunks" of information:

"***When elements are too narrowly specified, there is not enough redundancy to build up frequencies across respondents. Without repetition, aggregate maps tend to be too unstable. When elements are too broadly specified, too much meaning is lost when interpreting maps or ladders***" (Gutman, 1991: 146).

It is the relationships between these pathways of meaning that are the focus of interest, not the elements themselves. However, in order to simplify the explanation of the HVM, Table 5.15 presents the number of GPs who reported the 23 content codes, which represent the most important pathways of meaning.

Table 5.15: Content Codes/Concepts Included in the HVM

Number within the HVM	*Content Code/Concept*	*Number of GPs who Reported the Concept*
A1	**Effectiveness**	**113**
A2	**Low Cost**	**107**
A3	**Low Side-Effects**	**90**
A4	**Tolerability**	**81**
A5	**Safety**	**72**
A6	**Additive Hypotensive Effect**	**90**
A7	**Drug Experience**	**63**
A8	**Through-Peak Ratio**	**48**
C9	**Cardiovascular Risk Reduction**	**113**
C10	**Less Morbidity and Mortality**	**113**
C11	**Compliance**	**113**
C12	**Quality of Life**	**106**
C13	**Monotherapy**	**70**
C14	**Less Side-Effects**	**56**
C15	**No Orthostatic Hypotension**	**37**
V16	**Age and Comorbidity**	**113**
V17	**Age**	**113**
V18	**Comorbidity**	**108**
V19	**Age/Gender/Comorbidity**	**101**
V20	**Age and Gender**	**93**
V21	**Age-Drug Combination Therapy**	**89**
V22	**Age and Type of BP**	**62**
V23	**Age and Level of BP**	**45**

The twenty-three dimensions were organised according to eight attributes, seven consequences/benefits and eight clinical values.

5.4.10 Findings Obtained from the Hierarchical Value Map (HVM)

The relationships between the twenty-three pathways of meaning within the HVM suggested some interesting findings:

1. The upper part of the HVM suggests that GPs have a strong perception that it is essential to develop an ***individual patient approach*** for treating hypertension, according to ***clinical values*** such as ***patient's age, gender, comorbidity,*** and ***level*** and ***type of blood pressure***. As major risk factors for cardiovascular diseases, these ***clinical value*** dimensions include several different cognitive categories that ***strongly discriminate*** GPs according to their preference for different therapeutic categories. The ***attributes*** attached to these therapeutic categories, represented in the lower part of the HVM, and the ***consequences*** of their use, placed in the centre part of the HVM, ***may not*** be as relevant as ***clinical values*** for discrimination amongst the GPs therapeutic approach.
2. The profile of the HVM suggests that doctors assume that the risk of developing cardiovascular disease can be reduced if the choice of ***antihypertensive therapeutic categories*** takes into account the characteristics of the ***individual patient,*** particularly the ***level of risk for cardiovascular disease,*** the presence of ***target organ damage*** (i.e., consequence level), the occurrence of ***side-effects*** (i.e., attribute level) and ***coexisting disorders*** (i.e., value level).

3. As hypertension is more common in people aged 65 years or more, in whom ***target organ damage*** and ***concomitant disease*** (i.e., comorbidity) are more frequent, most dimensions in the upper part of the HVM encapsulate cognitive categories that represent ***elderly hypertensive patients***. These clinical values were found to be linked to ***attributes*** placed on the bottom right corner of the HVM. This configuration suggests that some therapeutic categories were chosen by GPs according to their ***effectiveness***, ***tolerability*** and ***safety***. Two therapeutic categories have been found particularly suitable for improving ***tolerability*** and ***safety*** in the treatment of ***elderly*** hypertensive patients: ***ace inhibitors*** and ***calcium antagonists:*** the former in ***elderly*** hypertensive patients with ***diabetes*** and ***dyslipidaemia***, as well as in ***renal insufficiency***, and the latter in ***elderly*** hypertensive patients with ***angina*** (i.e., ***age and comorbidity***). Furthermore, ***ace inhibitors*** and ***calcium antagonists***, along with ***diuretics*** in monotherapy, and the ***association*** in fixed dose between ***ace inhibitors*** and ***diuretics*** were found to avoid sudden drops in blood pressure and other ***side-effects***, particularly in ***elderly patients***. GPs argued that the ***attributes*** described earlier have an important impact on patients' ***compliance*** with the drug regimen, which in turn bridges, in the "north",

the three ***consequences*** represented in the centre part of the HVM, (a) ***greater cardiovascular protection***; (b) ***better quality of life***; (c) ***less morbidity*** and ***mortality***, to **clinical values**, and in the "south", to **attributes**.

4. The centre bottom part of the HVM indicates that the patient's socio-economic status will cause the GPs to think carefully about the cost-effectiveness of alternative drugs. Although doctors recognised that ***diuretics*** and ***beta blockers*** are the less expensive antihypertensive therapeutic categories available to GPs (i.e., ***low cost***), their intention to prescribe these products is attached to specific hypertensive patients who represent only a low percentage of the cardiovascular market. Nevertheless, ***low cost***, along with ***effectiveness***, are two of the most important ***attributes*** placed on the centre bottom part of the HVM. This "positioning" suggests that some GPs recognise an important role attached to the ***benefits*** of the use of ***diuretics*** and ***beta blockers*** on hypertensive patients with low incomes. Furthermore, the attribute ***drug experience***, placed in the bottom centre position of the HVM, reinforces the conclusion that some doctors believe that ***diuretics*** and ***beta-blockers*** are two important therapeutic categories which serve as a first-line therapeutic approach for hypertensive patients. Respondents have provided evidence that ***drug experience*** (i.e., product attribute)

with ***diuretics*** and ***beta-blockers*** has been reported in medical journals for decades and is supported by long-term clinical trials. Some GPs argued that these studies have pointed out not only the importance of these therapeutic categories for the improvement of cardiovascular protection and the quality of life of hypertensive patients, but also for a reduction of morbidity and mortality (i.e., consequences/benefits) on ***elderly*** and ***middle-aged*** hypertensive patients (i.e., age dimension - clinical value).

5. The disaggregation of the upper left clinical values' dimension placed on the upper right corner of the HVM may indicate that GPs are not uniform in their opinion towards the use of ***beta blockers*** and ***diuretics***. Although the success of certain ***beta blockers*** in reducing high blood pressure with a ***low cost*** and supported by decades of ***drug experience***, their prescription is associated particularly with ***young-adult*** hypertensive patients (i.e., age) and ***middle-aged*** hypertensive ***women*** with ***anxiety*** or ***depression*** (i.e., age-gender-comorbidity). The same reasoning is valid for ***diuretics*** which are particularly attached to ***elderly*** hypertensive patients, particularly those with ***borderline*** or ***systolic*** hypertension (i.e., age and level of BP and age and type of BP). In these cases, ***ace inhibitors*** were found to be great competitors of ***diuretics***.

6. The ladders suggested and the HVM confirmed that ***elderly*** hypertensive patients with ***concomitant diseases*** (i.e., age and comorbidity – or comorbidity alone) have been treated with ***ace inhibitors***, because this therapeutic category is ***safer*** (i.e., safe), as well as ***better tolerated*** (i.e., tolerability) and respects the ***trough-peak ratio*** (i.e., clinical values - therapeutic category attributes). This pharmacological characteristic has generally been associated with a ***low incidence of side-effects*** and with an easy-to-use ***once-daily*** therapy, which are important attributes for obtaining ***compliance*** with the drug regime. However, other therapeutic categories were also described as once-daily therapies.
7. The HVM, in its ***age*** and ***comorbidity*** dimension, also encapsulates ***elderly*** hypertensive patients with ***congestive heart failure*** (i.e., clinical value), who have been treated mainly with a fixed dose of ***ace inhibitor*** and a ***diuretic***. This association was described by doctors as ***effective*** and with an ***additive hypotensive effect*** (i.e., product attributes). However, some respondents have suggested that they prefer to use each component in monotherapy. That is, the analysis of the ladders suggested, and the links between the hierarchical chain of the HVM confirm, that some GPs have a therapeutic approach to ***elderly***

hypertensive patients with ***congestive heart failure*** which is based on ***ace inhibitors***, while others doctors reinforced the interest of ***diuretics*** for the same clinical situation. However, the ***attributes*** attached to these therapeutic categories, and the ***consequences*** of their use are almost the same. These findings derived from the disaggregation of the clinical values dimension of the HVM attached to ***age*** and ***comorbidity*** suggest that most doctors prefer associating a fixed dose of ***ace inhibitors*** with ***diuretics***. However, this option is not uniform and other GPs have preferred ***diuretics*** and some ***ace inhibitors*** to treat ***elderly*** hypertensive patients with ***congestive heart failure*** (i.e., age and comorbidity). Having said this, it should be added that ***diuretics*** and ***ace inhibitors***, in ***monotherapy*** or in ***association***, play a central role in almost all twenty-tree dimensions encapsulated within the HVM.

8. If we analyse the clinical value dimension which has been placed in the middle of the upper left part of the HVM, ***age*** and ***drug combination therapy***, it is possible to identify an important hierarchical value chain. Doctors have argued that combinations of two or more drugs from different therapeutic categories, particularly the ***association*** in fixed dose between ***ace inhibitor*** and ***diuretic***, are particularly relevant to the treatment of ***elderly*** hypertensive patients who have been taking ***other drugs*** not related with hypertension (i.e., age and drug combination

therapy). Respondents argued that the ***association*** in fixed dose between ***ace inhibitor*** and ***diuretic*** not only reinforces the ***addictive hypotensive effect*** of both components (i.e., product attribute - additive effect), but also reinforces the ***patient compliance*** (i.e., consequence) because it can be used in monotherapy once a day. As mentioned earlier, drugs with an easy-to-use ***once-daily*** therapy (i.e., consequence-monotherapy) improve ***compliance*** with the drug regime. Furthermore, GPs have pointed out that the association in fixed dose of ***diuretics*** and ***ace inhibitors*** diminishes the level of ***side effects*** (i.e., consequence - less side effects) that eventually derive from both components (i.e., clinical value - attribute - consequence).

9. The HVM also suggests that the dimensions ***age*** and ***comorbidity***, particularly the cognitive category of ***elderly*** hypertensive patients with ***renal insufficiency***, are linked to product attributes such as ***low side-effects***, ***tolerability***, ***safety***, in the case of doctors who prefer ***ace inhibitors*** or ***calcium antagonists***. GPs who prefer ***diuretics*** reinforce the ***low cost*** and the huge amount of clinical trials (i.e., drug experience) that have been supporting the interest of this therapeutic category on the treatment of ***elderly*** hypertensive patients. The ***association*** in fixed dose of ***ace inhibitor*** and ***diuretic*** has also been found to be suitable for the treatment ***elderly*** hypertensive patients with ***renal insufficiency***. Again,

the dispersion of respondents' intentions to prescribe those therapeutic categories is not only based on ***product attributes*** themselves, but also on specific patient characteristics, particularly ***demographic profile*** and ***concomitant diseases***. However, the representation of these networks, or ladders, in the HVM, shows that the GPs' therapeutic approach to ***elderly*** hypertensive patients with ***renal insufficiency*** or other ***concomitant diseases*** is ***partially identical*** in terms of ***attributes*** and ***consequences*** of all therapeutic categories, although ***heterogeneous*** in terms of therapeutic approach when ***clinical values*** are defined.

10. The far upper left corner of the HVM embraces an excerpt of doctors' cognitive structure which has been defined as ***age-gender-comorbidity***. This dimension is by far one of the most relevant findings elicited from the laddering interviews. This conviction derives from the fact that the cognitive category of ***age-gender-comorbidity*** has not been described by the different hypertension guidelines that have been advanced by prestigious, expert medical committees. Therefore, the perimenopause period, a time of changing ovarian function, may represent a strong clinical value for GPs, who have reported causal associations between the menopause and several symptoms and diseases. Cardiovascular diseases and hypertension are the other side of the coin. ***Again***, the GPs' drug choice was found non-homogeneous when categories from

the ***age-gender-comorbidity*** dimension are used. This dimension is centred on the hypertensive ***middle-aged woman***. This cognitive category has been structured in doctors' memory around key patient typologies[5]. These hypertensive prototypes, which capture the core meaning of the ***age-gender-comorbidity*** dimension, encapsulate hypertensive ***woman*** (i.e., gender) in ***perimenopausic period*** (i.e., age) with one important factor of risk, ***obesity***, associated with ***diabetes***, ***dyslipidaemia***, and ***anxiety*** or ***depression*** (i.e., comorbidity). Three different patient typologies derive from this excerpt of the cognitive structure: (a) ***Obese*** hypertensive ***woman*** in ***perimenopausic period*** with ***diabetes***; (b) ***Obese*** hypertensive ***woman*** in ***perimenopausic period*** with ***dyslipidaemia***; and (c) ***Obese*** hypertensive ***woman*** in ***perimenopausic period*** with ***anxiety*** or ***depression***. These three typologies were found particularly relevant in discriminating between the GPs' drug choice. Again, ***ace inhibitors*** play an important role in all them, particularly the first two, while ***beta blockers*** are relevant for the last one. However, if we define the same ***woman*** in ***perimenopausic period*** (i.e., ***age*** and ***gender*** dimension) neither with ***obesity*** nor with other factor of risk, the reality changes in terms of drug therapy.

[5]Patient typologies represent prototypical abstractions induced from past clinical experience with specific instances of the phenomenon and provide the basis for identification of features through which the phenomenon is categorised. Patient typologies are, then, the result of cognitive processes and, in turn, shape subsequent cognitive processes.

*11.*The upper-centred dimension of ***age*** and ***gender*** (i.e., clinical value), which are placed on the far right bottom of the HVM, encapsulates the category of ***woman in perimenopausic period***, in which ***diuretics*** and ***ace inhibitors*** are again the ***two main competitors*** in discriminating doctors' prescribing behaviour. That is, a dichotic reality emerges from respondents' pharmacological decision-making, which appears to be centred on ***diuretics*** and ***ace inhibitors***. This dichotomy varies according to a ***symmetric relationship*** between the ***existence*** or ***absence*** of ***comorbidity***. If any type of comorbidity exists, ***ace inhibitors*** have been found to be ***safer*** (i.e., safety attribute), ***better tolerated*** (i.e., tolerability attribute), and with ***lower side-effects*** (i.e., low side-effects attribute). By contrast, if there is a total absence of comorbidity, as represented by those dimensions of clinical values in the upper centre and right corner of the HVM (i.e., ***age*** and ***gender*** - hypertensive ***woman in perimenopausic period***; ***age*** and ***level of BP*** and ***age*** and ***type of BP*** - elderly hypertensive patients), ***diuretics*** and ***ace inhibitors*** discriminate amongst doctors into two different groups of respondents in terms of therapeutic approach. Particularly important in this discrimination between GPs, is the category hypertensive ***woman in perimenopausic period***, which belongs to the dimension of ***age*** and ***gender***. The same reality can be found within the dimension

age alone, which has been placed in the upper left part of the HVM. In this dimension, the categories of ***middle-aged*** and ***elderly hypertensive patients***, were found to be important descriptors of GPs' drug choice in terms of ***diuretics*** and ***ace inhibitors***.

12. The HVM also shows that ***comorbidity*** alone is an important dimension. Placed at the upper-centre of the HVM, just above the last consequence dimension, ***comorbidity*** embraces all the concomitant diseases or factors of risk that may be attached to hypertensive patients, independent of their age. Some of these cognitive categories reinforce the importance of the ladders established within the ***age*** and ***comorbidity*** dimension. In short, it appears that ***diabetes/dyslipidaemia*** or ***obesity***, two of the most important categories encapsulated within this dimension, are neither factors of risk attached exclusively to ***elderly*** hypertensive patients, nor less important in terms of discriminant power than other cardiovascular factors of risk. The analysis of ladders represented within the HVM suggests a strong link between these factors of risk and the attributes attached to ***ace inhibitors***.

13. As described earlier, the HVM reinforces the conclusion that the link between therapeutic categories' ***attributes*** and ***clinical values*** that is established by ***consequence*** dimensions has not distinguished the respondents. That is, Portuguese GPs who were interviewed are

strongly homogeneous in terms of ***consequences/benefits*** they have been looking for when they decide to prescribe the different therapeutic categories available to treat hypertensive patients. At the "midlands" of the HVM it is possible to identify several ***consequences/benefits*** that link the two antipodes levels of clinical values and attributes: ***cardiovascular protection*** to reduce the ***morbidity*** and ***mortality*** and to improve the ***quality of life*** of hypertensive patients, if ***compliance*** with the therapeutic regime is obtained.

14. Three other ***consequences/benefits***, which have been placed on the bottom left corner, are also mentioned in the HVM: ***monotherapy***, ***less side effects***, and no ***orthostatic hypotension***. As pointed out earlier, these ***consequences/benefits*** are particularly important for improving patients' ***compliance*** with the therapeutic regime. In the terminology developed earlier, these ***consequences/benefits*** are principally linked to the attribute ***addictive hypotensive effect***, which exclusively belongs to the ***association*** in fixed dose between the ***ace inhibitor*** and ***diuretic***. In this case, the HVM has placed the consequences/benefits of ***monotherapy***, ***less side effects***, and no ***orthostatic hypotension*** on the opposite bottom corner of the other consequence/benefit of ***compliance***, and close to its origin (i.e., the attribute ***addictive hypotensive effect***).

This hierarchical pathway is closely related to two different clinical values represented by the dimensions (a) ***age*** and ***drug combination therapy***; and (b) ***age*** and ***comorbidity***. Both of them are attached to ***elderly*** hypertensive patients. The former is designed to absorb the ladders developed by respondents who have placed great emphasis on the use of the fixed dose of the ***ace inhibitor*** and ***diuretic*** to treat ***elderly*** hypertensive patients who were prescribed ***other drugs*** for non-cardiovascular diseases, while the latter is particularly attached to ***elderly*** hypertensive patients with ***congestive heart failure***.

A final issue we wish to comment upon and reinforce, is the role that GPs have attached to ***attributes*** to characterise the five major therapeutic categories for treating hypertensive patients. In looking at differences between these therapeutic categories in terms of ***attributes***, the results suggest that ***GPs use these attributes to characterise the therapeutic categories rather than for drug decision-making.*** To understand this surprising finding, it is important to bear in mind that the medical-pharmaceutical market has a number of special characteristics, which were described in Chapter II. One of most important of these special characteristics is that the person (i.e., the doctor) who chooses the ethical product(s) and to whom most promotional effort is addressed, is not the

purchaser. In ***consumer*** decision making, the perceptions of ***product attributes*** are often important discriminators when organising choice criteria, because consumers use these products in their daily life. ***In doctors' decision making, the product is absent from their daily clinical activity***. It follows then, that the importance of ***product attributes*** for ***consumer*** decision making is different from the importance that ***product attributes*** have for GPs therapeutic approach. That is, therapeutic categories ***attributes*** have a ***characterisation function*** rather than a ***decision making function***. This ***characterisation function*** is important to link therapeutic category ***attributes*** to ***patient typologies***. For example, as has been noted, there is evidence that the clinical value ***comorbidity*** in its ***diabetes/dyslipidaemia*** category, makes GPs prescribe ***ace inhibitors*** rather than ***diuretics*** in ***elderly*** and ***middle-aged*** hypertensive patients. That is, with few exceptions, ***ace inhibitors*** have no undesirable ***metabolic effects***, which may be not the case for ***diuretics***. However, if the same ***elderly*** and ***middle-aged*** hypertensive patients ***have no commorbidity***, particularly ***diabetes*** or ***dyslipidaemia***, some GPs prefer ***diuretics*** while others are more keen to use ***ace inhibitors***. Subsequently, it is the ***patient typology*** that guides drug choice as a function of the ***characteristics*** attached to the ***therapeutic categories*** rather than ***product attributes*** by themselves. Nevertheless, some of these attributes are important in

understanding how GPs organise their therapeutic approach to different ***patient typologies***. ***Ace inhibitors*** and ***calcium antagonists*** are more linked to ***safety attributes***. Some doctors have presented ladders which reinforce the importance of ***ace inhibitors*** in terms of attributes such as ***throug-peak ratio*** and ***neutral metabolism***. In a similar vein, ***diuretics*** and ***beta blockers*** were considered ***less expensive*** and with a ***longer experience*** in the treatment of hypertension than the other therapeutic classes. However, this perception was common across all the respondents, and some of them were found not to prescribe diuretics in most cases. It is therefore not surprising that for the same hypertensive ***patient typology*** derived from the combination of clinical values such as ***age***, ***gender*** or ***comorbidity***, some GPs prefer ***ace inhibitors*** while others choose ***diuretics*** as the best therapeutic approach. These findings suggest that GPs may be categorised according to whether they are "in favour of", "indifferent to", or "opposed to" the use of ***diuretics***, and ***ace inhibitors***, or the ***association*** of both components, with regard to important patient typologies.

In short, it appears that hypertensive patient typologies, based on clinical values such as ***age***, ***gender***, ***and comorbidity***, alone or in association, has a strong discriminant power to categorise GPs according to their first-line antihypertensive therapy.

5.5 Methodological Limitations

Before discussing the results and their implications, **two limitations** of the methodology should be noted:

First, is the uncertainty about whether the GPs' ladders represent their real prescribing behaviour or just their knowledge about the national guidelines for the management of hypertension issued by health authorities. This problem has been addressed in recent research: "***We cannot exclude that some answers were given just to demonstrate that respondents were in line with pharmacological criteria***" (Himmel et al., 1997: 169).

Second, although the medical language used by GPs during the interviews was familiar to the researcher[6], the differentiation of specific pathologies within the same coexisting diseases was not an easy task. That is, *some medical vocabulary used by a small number of GPs was too technical for a clear understanding of their importance in the context of the ladders.* For example, a few GPs suggested that hypertensive patients with ***renal parenchymal disease***[7] and hypertensive patients with ***renovascular disease***[8] would require a special categorisation in terms of pathology. However, this technical vocabulary was content-analysed by the researcher and then by two independent judges (one cardiologist and one

[6] given the past experience in the marketing and sales department of the international pharmaceutical company that supported the financial costs of this exploratory study.

[7]Renal disease that reduces the number of functioning nephrons, leading to sodium and water retention, which increases blood pressure.

[8]Renal artery stenosis that may be associated with all stages of hypertension, particularly resistant hypertension. When bilateral, can lead to reduced kidney function (ischemic nephropathy).

GP) who confirmed that both situations may be included within the ***comorbidity value dimension*** as ***renal insufficiency***. Their agreement supported the view that this small number of GPs was deliberately skipping certain "***Why***" questions concerning their therapeutic approach rather than approaching new clinical values.

Finally, the percentage of the Laddering interviews (35%) in relation to the total number of interviews indicates that *a significant number of GPs addressed were suspicious about the researcher's work because it was overlapping a special police investigation to determine the veracity of bribes given by some international pharmaceutical companies to GPs for influencing their therapeutic approach.* Having said that, it should be added that it seems reasonable to expect that this "suspicious environment" may have contributed to a selection bias in an unknown direction.

Despite these limitations, several conclusions arise from the Laddering in-depth interviews developed during the exploratory phase of the research.

5.6 Conclusions

This exploratory study attempted to demonstrate how Means-End Theory (Gutman, 1982) and the Laddering Technique (Reynolds and Gutman, 1988), through the algorithm LadderMap (Gengler and Reynolds, 1995), could bring a useful perspective to the study of GPs' prescribing behaviour. Essentially, we are building an understanding of how doctors organise their perceptions and make sense of the heterogeneous complexity of different clinical values such as ***age***, ***gender***, and ***comorbidity*** for the therapeutic management of hypertensive patients. Such an understanding is of interest to academics for further study of GPs' therapeutic approach, and has a managerial relevance for the particular domain of pharmaceutical marketing strategy.

Substantively, the findings suggest that Means-End Theory and the Laddering technique can be regarded as a strong theoretical and methodological tool to specify GPs' cognitive processes determining how ***clinical values*** lead to the activation of subsets of cognitive structure in terms of ***patient typologies***. Furthermore, the Means-End Theory and the Laddering technique have shown how these ***patient typologies*** then guide the formation of doctors' behavioural intentions in terms of the chosen therapeutic category and consequences of its use.

The laddering results have shown that there is several different patient typologies that influence drug choice. As a result, to use a ***hypothetical hypertensive patient*** is to encourage doctors to produce only a very small portion of their complex clinical reality in terms of patient typologies.

According to the laddering results, the ***hypertensive patient with diabetes mellitus*** is but one of several patient typologies that doctors have to define their therapeutic approach. In this case, neither the ***age*** of the patient is defined, nor the ***gender*** is indicated. That is, ***comorbidity*** is the only clinical value that was assumed to explore the drug selection. It is therefore not surprising, that Segal and Hepler's (1985; 1982) model was found an accurate predictor of drug choice. However, ***product attributes*** such as ***cost of the treatment*** and ***side-effects***, as well as ***consequences*** such as ***control of disease*** and ***patient compliance***, are ***very similar across doctors.*** Consequently, the accuracy of the model results from the selection of a hypothetical hypertensive patient whose variance in terms of therapeutic approach is very low. That is, the definition of a hypothetical case of a patient with ***diabetes mellitus*** and ***hypertension*** tends to reinforce the model's accuracy in terms of drug choice because it restricts the range of available therapeutic options. This helps to explain the reason why, in contrast to their 1982 study, the Segal and Hepler (1985) results indicated that the value placed by doctors on the various outcomes made

little difference to the predictive value of the model. In this instance, the doctors' perceived probabilities of outcomes was found to be enough to alone predict their intended drug choices.

Our exploratory study approach represents another research strategy trying to find out the ***real hypertensive patients*** that influence GPs in their therapeutic approach. The results suggest that the most important implication derived from this ***real hypertensive patients*** research strategy is that the drug choice is ***patient oriented*** rather than ***attribute oriented.*** That is, "***For many product categories or subclasses of categories, respondents are much more likely to make preference judgements at the consequence and values levels than at the attribute level***" (Reynolds and Gutman, 1988: 26).

Methodologically, the results from the Laddering procedure indicate that Reynolds and Gutman's (1988) assumption that would be possible to categorise "***consumers with respect to their values orientation for a product class or brand***" because ***"the value orientations in a person's ladder may serve as the basis for classification***" (Reynolds and Gutman, 1988: 25) appears to be correct and therefore ***deserves further investigation***. As a result, it is our belief that it is possible to extend, methodologically, the importance of these ***clinical values***, in terms of ***patient typologies***, as ***explanatory variables to categorise Portuguese GPs according to their first-line drug therapy.***

5.7 Summary

The purpose of this chapter was two-fold:

1. to use the Means-End Theory and the Laddering technique to elicit excerpts from the GPs' cognitive structure that were relevant for the therapeutic approach; and
2. to analyse the interest of this cognitive information on subsequent model development to categorise Portuguese GPs according to their first-line therapeutic approach.

In the exploratory phase of this research, only ***clinical values*** were found to have ***discriminant power*** in terms of the therapeutic approach.

Clinical values such as ***age***, ***gender*** and ***comorbidity***, are the main heuristics used to organise different patient typologies. These GPs' ***mental schemas*** are relevant for organising their drug therapeutic approach.

As is typical in exploratory studies using means-end chains (e.g., Olson and Reynolds, 1983), the data generated were not numerical. Instead, the data were in the form of protocols and means-end maps for individual consumers. Patterns of responses and observed similarities across respondents form the results of this exploratory phase of the research:

- The number of ladders per GP are more than the double the numbers reported in some recent studies on consumer behaviour using Gengler and Reynolds' (1995) algorithm (Frauman et al., 1998; Klenosky et al.,

1993), but are not atypical when compared with other studies that have used the same algorithm (Sorensen et al., 1996);

- A great homogeneity on GPs' ladders in terms of ***clinical values***;
- The ***clinical values dimensions*** are particularly relevant in terms of the discriminant power to differentiate doctors according to their drug therapeutic approach;
- A clear differentiation of the GPs' drug therapeutic approach in function of the patient's ***age***, ***gender***, and ***comorbidity***, which represent the main heuristics to organise hypertensive patient typologies;
- Although the ***patient typologies*** are constructed within the constraints of a ***medical culture*** which defines the appropriate therapeutic approach to be used, ***non-homogeneous first-line drug therapeutic approaches*** by the GPs on the same ***hypertensive patient typologies*** have been found;
- A final point to note here is that the findings from the laddering approach support the view that the disagreement among Portuguese GPs about the best antihypertensive therapeutic approach may reflect the reality that Beevers and MacGregor (1995) have described: "***it is not surprising, therefore, that there is some disagreement even between experts about which drugs or combinations of drugs are best for the individual patients***" (Beevers and MacGregor, 1995: 169).